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CAPABILITIES OF MONTANA'S  
RESOURCES

The Governor's Symposium Series  
October 25, 26, 1974

Sponsored by  
UNIVERSITY OF MONTANA  
SCHOOL OF FORESTRY

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\* To maintain the integrity of the author's speech, editing was limited to introductory salutations and remarks.

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## F O R W A R D

The symposium was scheduled for discussion of environmental issues between groups of divergent interests. Individual speakers are recognized specialists with expert knowledge within their respective disciplines. Information was introduced to encourage the audience to question and search more thoroughly for knowledge that will benefit the interaction of ideas relating to population, ecology and the adequacy of resources.

The program was divided into two parts, Natural Resource Development Options and Constraints To Natural Resource Development. The last speaker summarized the speeches, highlighting significant and sensitive areas of interest.

The purpose of the first part of the symposium was to inspire confidence in the enactment of a new land ethic. This session examined the primary and secondary opportunities to develop each major natural resource. The objective was to develop an awareness of man-available resources considering the vital options we may lose in the future due to scarcity.

The second part of the session was divided into the human and ecological elements. The objective was to identify the interdependence of available resources and values that restrict options for the present and in the future. The concern was for interaction between population, ecology and adequacy of resources.

## A C K N O W L E D G E M E N T S

The program was developed through cooperation of the Governor and state agencies. Representatives from federal agencies and departments supporting and participating in the symposium included the Environmental Protection Agency, Forest Service, Geologic Survey and Interior. A special thanks to Dean Robert F. Wambach for his support in publishing the proceedings of the symposium.

## WELCOME AND OPENING REMARKS

by Gary J. Wicks  
Director  
Department of Natural Resources and Conservation  
Helena, Montana

We are all aware, I think, of the richness and variety of Montana's natural resources. A nomenclature of the Treasure State is not inappropriate--our heritage is rooted in exploitation of these resources. The discovery of gold in the 1860's brought the first permanent settlers. Copper mining in the 1880's brought the first railroads and cheap land brought the first farmers and ranchers. Most Montanans believed this was good in every sense of the word. Now, a century later, we find ourselves in a period of crisis. We are, on the one hand faced with an unprecedented demand for the riches of this state, not just for raw materials such as coal, copper, timber and water, but also for recreational, scenic and other values already nothing but memories in other areas of the nation. On the other hand, we are becoming fully aware that unconsciously answering these demands will engender environmental, social and in the long run, economic and political changes that are simply unacceptable. Is there a middle ground? I don't believe anyone can answer that question with certainty. We need more information, more research on the trade-offs involved and more knowledge of the probable impact on Montanans and their way of life.

Now, as most of you know, the Department of Natural Resources and Conservation was created in December of last year. The new department consists of the old Water Resources Board, the State Forester, the Oil and Gas Conservation Commission and the Soil Conservation Committee, all reorganized a divisions within the new department. We are, I believe, now in a far better position to define the limits of our resources and they are finite in determining the long range cost of their exploitation. However, we simply do not have the capability to go it alone, nor does all of state government. We must, to an extent never contemplated before, make use of the professional and technical resources available in our university system without jeopardizing academic freedom and independence.

We must abandon the suspicion that heretofore prevented the exchange of ideas and information which I believe prevented the cooperation necessary to solve the critical problems facing our state. We must begin now, the impending development of our natural resources in a crisis which does not allow the luxury of time to sit and ponder, especially with regard to coal in eastern Montana -- events are foreclosing alternatives. We need to take positive and intelligent action to keep our options open, otherwise we may forfeit, in the coming decades, a last opportunity for Montanans to control their own destiny. I am therefore pleased to welcome the university's further involvement through this symposium, in what is obviously an area of basic concern to me and the Department of Natural Resources and Conservation, but which is also of concern to all Montanans.

Perhaps if we can begin to work closer together we may be able to demonstrate that although our resources are limited, our imagination and wisdom and their use in conservation need not be.

## THE SPECTRUM OF MONTANA'S RESOURCES

By Governor Forrest Anderson  
Helena, Montana

Presented by Thomas Judge  
Lieutenant Governor

Ladies and gentlemen, it is with a great honor that I have the privilege today to offer your key-note speech in the absence of Governor Anderson. And I hope this goes a little better than the rest of the day so far, because we started off not able to land here and then started driving and ran out of gas and I have run out of voice in the past week so I hope you bear with me. First of all when I was coming over here today I was thinking about something that I think we all ought to think about. First of all, I was thinking that I am 38 years old and in just another 38 years that would put me either underground or as one of Montana's senior citizens and in that very same span of time I think in a very short generation, Montana could be exhausting or have exhausted its resources that took literally millenniums of geologic growth to build up. It could suddenly collapse into decay in just the next 30 or 40 years. I think the avoidance of that happening is really what this conference is all about and what you men and women have come here to share your ideas with others and I congratulate you for that.

I think that we very deeply need in Montana a new perspective with regard to growth and it must be a Montana perspective; one that is developed

by Montanans, that benefits Montana first and the national interest second. I think that we could learn a lot if we went back to the Indians and studied the Blackfeet and the Crow and the Kalispells and the Flatheads and a few Joseph Kinsey Howard's great stories about the Indians; it has a little message, I think, for us. First of all, he said that the Indians had no noxious weed. If the weed was poisonous, then he used it for poison. If it was a intoxicant, then he got drunk on it or at least he got pleasantly stimulated. If he couldn't eat it, or drink it, or paint it, or he squeezed out juices to brand his horses painlessly, or he would try it out as an agent for abortion. If this didn't work and it seldom did, he'd keep trying. Ultimately he discovered it seemed to cure that hangover, or for his constipation or heal a rash or something. From then on the plant had a place in the economy and it was relevant to the partnership that he had with nature. He didn't expect any coddling; nature did her part by offering products to him freely. It was up to him to find uses to which they might be put without waste and respectful regard for her whims.

The beauty of those early ecologists is now gone. Today we invent a use and then we go looking for the resource. Many people across this nation and throughout the world are looking to Montana to supply the raw materials for their ideas, and supply if we can. Fifteen million acres of cropland, 43 million acres of range land make us one of the nation's most productive agricultural states. Seventeen million acres of commercial forest lands places us in the forefront of timber producing states. Copper ore reserves of more than one billion tons and iron ore reserves of over a hundred million tons insure the future of metal mining. So called strippable coal



reserves approximate 30 billion tons and water over 40 million acre feet or about 1/10 of the volume of the Mississippi flow out of this state each year. We have with the addition of the Lincoln scapegoat area, 1.7 million acres of wilderness and about 1/2 million acres of primitive area. Our total scenic and wildlife resources are incomparable. We are also rich in human resources. Montanans are far better educated. In the number of people in the state with four years of college has increased dramatically from 26,000 in 1960 to 40,000 in 1970. With four years of high school from 100,000 in 1960 to 125,000 in 1970. If education is a measure then Montanans are now in a far better position to understand the complex problems facing us and more willing and able to work out the solutions. One of our most valuable resources, in my opinion, is the unique quality of life that we enjoy in Montana and the people's pride in this way of life and the preservation and continuation of the kind of life we know in Montana. And therein lies the challenge. This country's demand for raw materials and energies appears insatiable. Unconsciously answering those demands may bring Montana's way of life to extinction. We've been lucky, I think, in the past. Our resources seemed unlimited and they were treated accordingly. Timber lands have been destroyed, range land and soil have been made unfit for agriculture or wildlife. Water and air polluted. People's hopes shattered by the boom and bust cycles of the colonial economy. Profits were handed over to outside interests. Rivers dammed, wildlife obliterated. With the good luck to survive in spite of our mistakes it will not come again. We know our resources are limited as the statement of their quantity suggests and that a close relationship exists between the exploitation of one resource and the impact on another. We are becoming vaguely aware of the current and

anticipated need and demand for resource utilization. The world-wide trend throughout recorded history has been economic growth; and no nation has pursued that goal with more diligence than the United States has. The gross national product, considered the prime indicator of economic well-being rose 55% from 1959 to 1969. There are, of course, benefits derived from this growth. During that same time per capita income rose about 34% while unemployment decreased 2%. The number of persons living below the poverty level decreased by 10%. Growth also seems to be associated with a change and social mobility and with an increasing standard of living for everybody. Yet we are finally beginning to realize in America that growth in itself is not the answer. Despite our so called high standard of living we cannot deny the slums of Chicago and New York and other cities. We have an increase in crime rate, polluted air and water and destroyed land in West Virginia, Kentucky, Ohio, Pennsylvania. We read of a new land boom of land speculation in our state, much by outside forces. For instance the series in the newspapers reported that in one area in this county sixteen out of twenty-nine parcels of land were purchased by Californians and only three purchased by Montanans. Yet absolute resistance to change and development is futile also. You cannot build a fence around Montana even though a lot of people would like to do that. As an integral part of a great nation we have an obligation to recognize and respond to its needs. With a population of only 700,000 and only four representatives in the Congress, four electoral votes and a colonial economy we could not afford such a prohibition in any event. So we turn to development and resources-- certainly unrestricted operation which fatten pocket books but what sacrifice would we pay. The development

of southeastern Montana coal reserves demands huge amounts of water, more dams, and pipe lines and as much as 80% diversion of the Yellowstone River. And that is in an area that is already designated as semi-arid. Full employment of our strippable reserve would disturb 770,000 acres. Even if reclamation would be effective there would be a delay before vegetation could cover and is firmly enough established to make grazing possible. Wildlife would be displaced; there will be dust pollution in many cases. And in the case of the Mine Mouth Generating Plants as much as 780,000 tons of particulates yearly. Montana's population could increase by 1/2 a million which would bring the same problems that we have in the large urban areas. Tax base would be broadened, of course, but expenditures would also be necessary for governmental services for education, and recreational, and health benefits. The Environmental Quality Council has stated "the life time of proposed generating facilities for Montana Coal Development is estimated to be about 30 years. After that we could have higher unemployment than ever before, declining tax base, and a stagnant economy. The environment would be degraded and unlike our forests our coal deposits are not renewable except in terms of millions of years. Obviously the time has come for our society to shift its focus increasingly from quantity to quality. And Montana could lead the way but it won't be easy. We are first of all faced with promises of quantity increases of a magnitude unheard of before. Exploitation of our coal and water resources could result in capital investments of billions of dollars, a hundred thousand jobs, an increased revenue and substantial economic growth. These promises are unquestionably appealing to a state which experienced a net out-migration of 58,000 people between 1960 and 1970.

And our per capita income once higher than the national average has now dropped far below. Our unemployment rate is even higher than the national average and at least 23 counties have been listed as suffering from chronic unemployment. Secondly, we have few of the economic and political resources necessary to resist the demand for raw materials and energy currently being sought throughout this country. So we very desperately need new legislation in state government. We need better mining laws that would protect and control the strip mining and I think we need a moratorium until such laws are passed by state and federal government. I think that we need new laws to insure that our water is used for many purposes and not just to provide power for signs in Las Vegas. We need laws requiring environmental studies before a generating plant is built in areas where construction will ruin the ecosystem. We need modifications of our eminent domain laws to insure that lands appropriated and really in the best interests for the public. We must demonstrate the capacity and courage to substantially modify our attitudes about resource development. We will then be a long way down the road toward the realistic development of a true Montana perspective.

## LAND RESOURCE DEVELOPMENT

by Ted Schwinden  
Commissioner of Lands and Investments  
Helena

As I looked at the purposes set forth on this symposium on Montana resources, somewhere in that prologue there is language that says something like this: that the purpose is to inspire confidence in the enactment of a new land ethic for Montana. I want to say at the onset that I'm not that optimistic the conference will achieve that end. I would have to confess I'm not even that sure I know what a new land ethic is or should be for Montana. I do feel that in terms of goals for Montana, that there are two major areas; two objectives that the majority of Montana people could agree would be desirable for our state. The first is that Montanans must determine any new land ethic. Our future must reflect the desires of the Montana people. I am not so provincial that I advocate Montana for Montanans. I am not so naive as to ignore the inevitable conflicts between national objectives and desires of the people of this state. But I am insistent that Montana's future, whatever it might be, must reflect more than the esoteric visions of national or state planners. There is nothing wrong with planning, but planning must not only be people oriented. It has to be people originated or it is bound to fail.

There is a second goal on which most of us would agree; to retain the "best of what is left," while at the same time provide a viable economy in

which both the aesthetic and the material needs of Montana people can be met. Montana has about 100,000,000 acres, and 60% of that land resource is held in private ownership. Thirty per cent of Montana is held by one or the other of the federal agencies. Five per cent is Indian trust land, and approximately five per cent is owned by the state of Montana. Roughly 30,000,000 acres in Montana is controlled by the Bureau of Land Management and the Forest Service. The land is located in Montana; it is part of our resource, yet by and large the policies that will determine the future uses and development of that resource will be made, not in Montana, but in the Congress or the administrative agencies in Washington. Our people are in danger of being drowned by "population".

Montanans, 700,000 of us, are dwarfed by the two hundred odd million people in the United States who look at "our" resource as "their" resource. Some five million acres are controlled by the Indian people of this state. Five per cent, some 5.1 million acres is, as I said, controlled by the state of Montana. And even here there is a conflict because historically, the five million acres that the Board of Land Commissioners administers has had as its primary objective a maximum return to the trust for the support of common schools, and only incidentally the tenuous concept of the welfare of the people of the state of Montana. And finally, in the broad area of 60% private ownership is the greatest conflict of all. Public good versus private profit. The tradition in this country is "it's my land and I will do with it as I wish".

I will now set forth what I think are the three major threats that we face in our attempt to achieve the optimum use of our natural land resource. The first of the threats is fragmentation. I'm talking about subdivisions and

associated problems. The second threat is one of isolation of the resource through acquisition. The parceling out, the acquisition by the private sector, of desirable tracts of land and removing them from the area of public access and public use. And the third area is one that occupies; sometimes, I think, unfortunately, the headlines everyday; the problem of degradation through exploitation of the resource. And, if you live with the regulation of mining in Montana as I do, you know that is an issue in the state of Montana! There is little time to detail each of these problem areas. As far as the problems posed by the fragmentation of our land resource, Lee Papers did a series last week on the problems of land speculation; the subdivisions of ranches into recreational and home sites. Just a couple of months ago we had a very interesting discussion and decision on the siting of a power line from Missoula to Hamilton. Here again is a problem in a use of the resource on a fragmented basis.

In the area of isolation I doubt there is a person in this room who does not know that more and more large chunks of prime Montana land, timber, lake lots, street lots, and so forth are disappearing behind fences and no trespassing signs. There are also areas that are disappearing into wilderness areas which forms sort of an elitist segregation from total use by all the people. And as far as the degradation of the land resource through development, coal fields and their potential development has occupied the center of public attention for months. Yet, I find the total destruction of a sand or gravel bar in the Yellowstone River equally serious, because in some cases, I am sure that the damage which ensues can outweigh that of the coal mining.

I want to close by talking a bit about the 5% of the land resource in Montana which is under the direction of our Department. Admittedly, it's a very tiny part. Its impact is lessened even more by the fact that it's

distributed through all fifty-six counties; not evenly, but through the entire state. But it is the only portion of the state's land resource over which the state has substantial control at the present time. To that extent it does provide a special responsibility, and I think a unique opportunity, for the state of Montana to test in the field the kind of options that we're talking about, and the purpose and objectives of this program.

We can examine those options in the state land resource area to see whether or not they will work. We can say, "We have tried this and it works." One problem in the management of the state land resource (and I begin with a confession of inadequacy) is that historically state land management has been too often absent. The classification system established by the constitution at the time of Montana's statehood, simply said all state lands shall be divided into four categories: grazing, agriculture, timber, and city and town lots. You know those categories do not adequately describe a tract of land, most often they are an indication of present use. Secondly, the historical policy of the department, for many reasons and they're not bad reasons either, is that we have left the management decisions up to the user because administratively, and maybe politically, that was the easiest thing to do. Thirdly, as I indicated before, all the returns from state land, be it agriculture, grazing, timber, coal, or anything else, are by the terms of the grant of the federal government, committed to the support of common schools. And there is tremendous pressure to extract from the resources a maximum return to the schools, so it can be distributed each March to school districts throughout the state and relieve local property taxes.

What can we do in terms of intelligent and comprehensive management of this state land resource for the future? In my opinion, the first thing we



have to do is find out what we have; and we have begun this task. We need to inventory the resource, determine the characteristics of the respective tracts around the state, so that we can make intelligent management decisions. We went to the Constitutional Convention and succeeded in convincing the delegates that the state should be allowed to exchange its land. In many townships, particularly in eastern Montana, we own two sections out of every township. That is not the most desirable land ownership pattern from a management point of view. With the adoption of the new constitution beginning July of the new year, we will be able to exchange state lands; hopefully we will be able to block up some of our acreage for better land use management.

In 1969, for the first time, the Montana legislature gave a multiple use directive to the State Land Department. That action indicated a legislative desire that, while we should still look to maximizing returns on state lands, we should also look to the broader use of the resource. The language specifically says that in some instances we may accept a lesser return, if it appears in the judgment of the board and the commissioner that this is desirable in the interest of the people of the state of Montana.

The one area in which we are able to implement on a day-by-day decision making basis, land use or land resource management decisions, is in our resource development program. In 1967 the legislature authorized the Department to retain 2½% of all the monies which we collected as income from state lands, and put it back into the land. It sort of frightens you that we waited almost a hundred years to do that. For the first time we are able to do what any intelligent farmer, rancher, or any other person who owns a resource has always done; invest part of the earnings in preserving or improving the resource itself. Many, if not most, of our projects that we use these funds for are small. I

think of one, we feel is particularly successful, in which we invested \$1,960 state dollars on forty acres of land in the Milk Valley just west of Glasgow to convert some Milk River bottom land to irrigated pasture. It met the criteria which we have at least temporarily established. It increased the revenue to the school funds from 25 cents an acre to \$5 an acre. It provided for the lessee and for his family the opportunity to achieve a better economic unit in terms of his ranch operations. In the process we were able to retain part of the state acreage as brushy land and wildlife habitat. The resource development program as it applies to state land is unique in this respect; that the State Land Department is able to explore alternatives of the land resource development. And we make decisions--rightly or wrongly. The projects that I've indicated don't have the political sexiness of eastern Montana coal; they certainly fall below the awesome cost of projects like Libby Dam and they don't have the impact of the designation of a new wilderness area out of Lincoln. But, at least in this one area we actually are doing something about managing the resource of the future. We're making decisions, we're making mistakes, but we are having an impact on Montana land resource development insofar as it affects the 5.1 million acres of state owned land in Montana.

## THE WATER RESOURCE

by Carl H. Bronn  
Executive Director  
National Water Resources Association  
Washington, D. C.

Although I was asked to discuss specifics of resource capabilities, my reasons for not giving specifics about Montana's water are:

..a whole slug of experts are writing reports about the capabilities of Montana's water resources, and Montana's needs to be satisfied. Reports are coming via: (1) the State Water Plan; (2) Federal water agencies, like S.C.S., BuRec, and Army Engineers; (3) the Westwide Water Plan; (4) two multi-State river basin commissions; and (5) the National Assessment of the U. S. Water Resources Council!

..further, the foundation for realizing the capabilities of Montana's resources depends upon how governments regard the water and land resource, and who develops the powers to act -- in that regard.

So while the planners list potentials, lets you and I look at the foundation underpinning the realization of capabilities. Realization is, I suggest, a function of how governments' and citizen's groups regard the water resource.

THIS PROGRAM

The big words on the program of the Governor's Symposium are:

"Capabilities of Montana's Resources."

Following the big words are little words with big meanings, like:

..divergent groups

..ecology

..options we may lose

..a new land ethic

..constraints to resource development.

Since that list begins with "capabilities" and concludes with "constraints," so shall I. Because -- I suggest again -- the water capabilities realized depend upon how man regards the water resource, let's ask ourselves about:

WATER -- ITS NATURE?

- a. Does the water resource have capabilities which entitle it to treatment different from commodities in general?
- b. If so, do differing views about these capabilities -- such as catalyst in resource reactions -- bear on your issues?  
(Divergent opinions, ecology, options, land ethic and constraint).
- c. Do differences bear with force?
- d. Who wields the greatest force?

As to capabilities different from a conventional commodity, let us consider how the Federal government got into water resource actions. In doing this, we shall coincidentally discover something about power to act.

FEDERAL INTEREST -- A BEGINNING

In the beginning, the Congress questioned whether it had received from the States a right to augment natural capabilities of our water resources.<sup>(1)</sup>

Why did this issue arise? Because in a natural condition waterways were not sufficiently useful to satisfy people's needs.

Why not? Our natural water courses were not adequate nor dependable in configuration; they were not satisfactory in quantity and quality of flow.

And so the hand of man was needed. Would it be applied privately, by local governments, or by the Federation of States? For water supply, private and local entities went to work -- on a commodity basis, I presume.

But a need for inter-state navigation, a demand to avoid monopolies, and a growing divergence of opinion among States as to actions, caused a Federal interest also. Through the Commerce Clause of the Constitution, the Supreme Court held <sup>(2)</sup> that the States had empowered the Federal government to act. Thereafter, the Court held also [for the purpose of navigation] that navigable waters are PUBLIC PROPERTY.<sup>(3)</sup>

This Federal power -- granted by the States -- was later used by the Federal government to limit authority of the States!<sup>(4)</sup>

Even so, Federal actions had at least two objectives:

- a. to improve usefulness of the water resource;
- b. to reduce confrontations among States.

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(1) See Water Resources Law, the President's Water Resources Policy Commission; Volume III, 1950; Page 8.

(2) IBID.; Gibbons vs. Ogden, 1824, and others later.

(3) IBID.; Gilman vs. Philadelphia, 1865. [Non-navigable tributaries came to be included; see also PL 92-500, Sec. 502 (7).]

(4) IBID.; See Page 16.

In my view, the events cited -- which involved all three branches of the Federal government, and which were focused on Federal INVESTMENTS -- prove that government recognized water as a PUBLIC PROPERTY WHICH MERITS MORE THAN MARKET-PLACE MANAGEMENT!

FEDERAL INTEREST -- EXPANDING!

"Great oaks from little acorns grow." Having proved a Federal power about navigation, why not extend actions about the water resource to include flood control and electrical energy. Would the Commerce Clause stretch?

The water resource had the capabilities. People had a higher need for managed rivers than for natural conditions. Result: in the Commerce Clause (5a) Congress found the authority to improve natural river conditions so to reduce floods and to generate electricity.

But which branch of the Federal government would have authority to select among options for improvement?

The Supreme Court held that the Legislative branch has power -- exclusive power -- to make certain decisions, such as:

.."whether a particular project will have such a beneficial effect...as to warrant it." (5b)

That exclusive right of Congress often is overlooked by bureaucracy today.

Having got the "great oak," people looked at the potential of a whole forest. Why not Federal actions for irrigation, fish and wildlife, quality of water, recreation, hurricane protection, municipal water supply, and -- on

---

(5a) Flood Control: President Arthur to Congress on the MRC Report, 1882; Supreme Court, Jackson vs. United States, 1913 [IBID.; Page 18]. Or: Green Bay Case, 1891, and others. [IBID.; Pages 19-22] However, the restoration of natural conditions is the OJBECTIVE of the amendments of 1972 to the Federal Water Pollution Control Act.

(5b) IBID.; "Some Decisions for Congress Alone"; Pages 23, 24, 25.

public lands -- for all purposes?

Result: the Federal government did find the power to act for all those uses, and along the way it created uncertainties about rights granted by the States to waters flowing from public lands. Some uncertainties harass us still.

In summary:

- a. a fabric of delegated rights about water resources was woven; new threads from the Constitution were the property clause, war powers, treaty-making powers, and the general welfare power.<sup>(6)</sup>
- b. the action was Federal investment; the objectives were, in my view, social as well as economic.
- c. The yielding of rights generally was to facilitate alteration of the water resource, so as:
  - ..to enhance the usefulness of other resources;
  - ..to protect lives and property;
  - ..to generate energy;
  - ..to promote stability, and otherwise to improve the general welfare; and also,
  - ..to reduce conflicts.
- d. Thus, actions by all branches of government stemmed from the unique nature -- a nature not fully cared for by private enterprise and local entities -- of the water resource. This nature, epitomized by the Budget Bureau as "environmental workhorse," is defined further by the Supreme Court in these words:
  - .."A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it." [by Mr. Justice Holmes in 1931]

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(6) IBID.; Pages 28-58.

e. That power, and the regard from which it stemmed, has influenced, and surely will influence, the realization of capabilities of Montana's water resources.

Further powers arise. Let us trace some aspects of Federal power aimed at regulation of other's action, and less at the investment of Federal funds to make water courses useful.

#### FEDERAL INTERVENTION

The Supreme Court, when fixing the use of the general welfare powers with regard to the water resource, upheld the Congress in undertaking large-scale projects "...for the common benefit, as distinguished from some mere local purpose." (7)

Besides power to undertake development, Congress developed power to regulate. An interesting case is the Water Pollution Control Act of 1948. (8) There, the Congress established a Federal interest where ever pollution that reaches navigable water "endangers health or welfare." Note that is assuming this Federal interest in water, the Congress specifically acknowledged the primary rights of the States [with regard to pollution control].

In 1956 [while again recognizing the primary rights of States in controlling water pollution], Congress authorized the Federal government, in cooperation with States and others, to develop "programs to eliminate or reduce pollution." But, Congress said, IN ALL ACTIONS THERE MUST BE ACCORDED A "DUE REGARD FOR ALL LEGITIMATE USES OF WATER."

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(7) United States vs. Gerlach Livestock Company, 1937. [IBID.; Page 58].

(8) broadened from the navigation interest in the Refuse Act of 1899. That Act is only one sentence long; in the center of it is a clause "...whereby navigation shall or may be impeded or obstructed." Control was to assure usefulness of a water resource function -- commerce -- given up by the States.



In my view, usefulness was still a dominating criterion justifying Federal actions.

In 1961, the Congress again amended the Water Pollution Act, changing jurisdiction to the Secretary of Health, Education and Welfare. Soon thereafter, I found that "programs" did not necessarily relate to the usefulness of water. In fact, standards were applied to a reach of water practically inaccessible for use, and in which there was no aquatic life. Deviation from the aim of enhanced usefulness of water, to the satisfaction of ideas, had begun.

This "little acorn" also grew into a big oak. Five years later, the Feds, using the objective of the 1965 Water Quality amendments, <sup>(9)</sup> sought to force the States into prohibiting any change in conditions of water that would not enhance quality -- quality according to ideas, not according to usefulness. Citizens in your sister-state of Wyoming were leaders in the battle to avoid Federal imposition of a no-change criterion. But retrogression from the reality of usefulness to the concept of "naturalness" continued. And thus enters:

#### THE CAVE MAN CONCEPT OF THE WATER RESOURCE

The facts introduced so far prove that all branches of the Federal government found necessary -- and legal under powers delegated by States -- man's alteration of the natural characteristics of water resources. Now enters the Clean Water bill recently signed into public law over a Presidential

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(9) The objective was to enhance the quality of the Nation's waters.

veto; this bill has one objective:

.."to restore and maintain the chemical, physical biological and radiological integrity<sup>(10)</sup> of the Nation's waters."

Some members of Congress, and some Capitol Hill staff have assured me that the objective does not mean what it implies. But administrators and courts can devise extraordinary constraints with those words, followed by this definition in the bill:

.."Pollution is any man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water."

Whatever man has done -- and would do -- to improve the usefulness of water evidently is "pollution"! Will that regard for water be a new constraint on the capabilities of Montana's resources?

Well, just hear these results under the old law:

1. a field office of the Environmental Protection Agency held that dams are one of the worst forms of pollution.
2. EPA top brass upheld the field office, when the right to make such a judgment was questioned.
3. A field office of the Environmental Protection Agency -- acting under a law which recognizes the primary interest of the States with regard to water pollution -- threatens a State with sanctions if the State does not change its laws regarding USES of water!
4. The Clean Water bill, mentioned before, toughens the concept of abating pollution to "eliminating pollution."

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(10) See Conference Report No. 92-1465, Sec. 101 (a). The term "natural integrity" is used in the Senate version; "pristine" is also used. See reports of both Senate and House indicating that "natural" or original integrity is the target.

5. Further, the bill -- now the law -- defines navigable waters as "the waters of the United States."

These deepening interventions to restore water courses to cave-man conditions could limit your options about the water resource, and impose constraints upon your capabilities.

Constraints upon the "Environmental Workhorse" may be coupled with constraints upon privately-owned lands. Groups of outdoors people advocate tough legislation to impose a National Land Use Policy. They complain that House and Senate bills are not tough enough.

In fact, on the floor of the Senate, seeking amendments to toughen the bill, a recent Presidential candidate proposed:

.."No industrial, residential or commercial developments shall occur on agricultural lands of high productivity, as determined by the Secretary of Agriculture, unless approved by the Governor as necessary to the public health and welfare, or to provide housing as would otherwise be unavailable."

.."Except where no alternative exists, there shall be no further development of flood plains..."

Neither that, gentlemen, nor the people that pushed him into that position, offer a definition of "flood plain." I would make the bold guess that at least half of this Nation lives, works, and moves on soil that was deposited by floods, other than glacial floods.

I make a final point about a curious anomaly about land and water values:

- a. As regards Federal investments to develop water and related land resources --

..new policy would require a profit, and at the "opportunity" rate [i.e., average rate earned by private enterprises, from all opportunities, even as booze, babes, and betting.]

- b. But as regards Federal constraints upon private uses of land and water --

..new legislation would reduce the opportunities for profits which heretofore contributed to that average rate found desirable for "a" [preceding].

- c. Both "a" and "b" are supported by some "environmental" lobbyists; they decry private profits as a milking of the natural resources, but demand Federal profits [from the development of resources] at the milking rate!

#### CONCLUSION

I have summed-up as the facts were laid out. You may conclude -- as I do -- that realization of resource capabilities in Montana is a function of:

- A. the shape of the State desired by Montana people  
[should they agree, and thereafter act].
- B. aid from outside capital interested in profit  
[with short-range opportunities looming over long-range values].
- C. constraints from the National Capital, recently legislating for the pristine and still proposing a process to plan private uses of land [to favor long-range values over short-range options -- except as to Federal investments for development of water and related land resources].

Thus we have the picture!

With great potential in coal, oil, other minerals and metals, soil and landscape, Montana's "workhorse of the environment" -- or catalyst -- wears a Federal harness...and the Federal whip cracks ever harder. Capabilities count -- but only as reins permit: your reins as planners and participants;

those of private enterprise, profit motivated; and Federal laws increasingly aimed for an idea that nature's actions are always good, whereas the hand of man is bad.

Well -- a breach clout was fine for a stalking Indian; it's great at the gym, but more may be desirable at the Village Inn...or shall we meet in wigwams?

## RECREATION, FISH AND WILDLIFE RESOURCES

By Don L. Brown  
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In an effort to put some thoughts together for my assigned topic of this symposium, I read an article written thirty years ago by a Spanish philosopher that has a message I would like to convey to you today.

Jose Ortega y Gasset set down his thoughts on paper and called them Meditations on Hunting. While he discusses hunting primarily, it becomes obvious that fishing and other recreational pursuits were also on his mind. "The fact is that for almost all men the major part of life consists of obligatory occupations, chores that they would never do out of choice. Since this fate is so ancient and constant, it would seem that man should have learned to adapt himself to it, and consequently to find it charming. But he does not seem to have done so. Although the constancy of annoyance has hardened us a little, these occupations imposed by necessity continue to be difficult. They weight upon our existence, mangling it, crushing it. In English such tasks are called jobs; in the Romance languages the terms for them derive from the Latin word tripalium, which originally meant an instrument of torture. And what torments us about work is that by filling up our time it seems to take it from us; in other words, life used for work does not seem to us to be really ours....."

Senor Ortega goes on to explain how we dream of a day or a weekend or a vacation so that we may stop working and start really living. Whenever we have a moment, we escape to the enjoyable activities that make us happy. Generally speaking the escapes man chooses are hunting, or fishing, physical endeavors, that include sports and dancing, and finally conversing--including listening! Any one of the above is not merely a pleasure but usually a very determined effort that is remembered as a happy occasion--a very necessary part of our existence.

To illustrate my point, I quote from Ortega's meditations: "The difference is that sport is an effort made freely, for the pure enjoyment of it, while work is an obligatory effort made with an eye to the profit." All endeavors have different levels of effort, but no man can determine for another that his pursuit of happiness is more or less important than his neighbor's.

Whether we adopt the fact that "all work and no play makes Jack a dull boy" or that hunting and fishing are not as important as football or debate, we must admit that each man will fill his life's leisure hours with a form of happiness of his own choice, or it ceases to be happiness.

That his sense of freedom is dependent on a variety of forms of recreational pursuits, and equally as necessary to his life as his obligatory occupation, is the point I most want to establish this morning.

The capabilities of the other resource values that will be discussed here today are associated with jobs and are, for the most part, profit oriented. We vitally need the obligatory occupations that each of these profit oriented resources provide, but not to the point of eliminating the other very

necessary activities of living.

Quality of life, then, is related to your first choice of opportunities after fulfilling the obligatory occupation. If this choice happens to be hunting--can you feature anything worse than being faced with a Green Bay Packer football game on opening day of the elk season?

The objective of this symposium is to develop a line of communications between divergent groups on environmental issues. I submit that each of us is a divergent individual on what we want our environment to be. Communications, on a day-to-day and project-by-project basis, is the only tool that will lead us to an equitable solution of our diverse needs. To repeat that we must listen to each other becomes a cliché but until we recognize each other's hang-ups and are willing to help solve each other's problems, we can never refine our management techniques to protect all of our resources.

When we have an interaction of ideas relating population to the adequacy of our resources that IS ecology; we are not relating to something abstract, we are a part of it.

The primary and secondary options of fish, wildlife and recreational opportunities will vary with the option chosen for each of the profit-oriented resources. The fact that species will flourish or retrogress in relation to their habitat is not in question--the degree of sophistication our resource management techniques reach, and the degree of concern we demonstrate will determine their fate. Where a resource harvest carries the possibility of creating habitat degradation that is irreversible, we should delay it until the knowledge and techniques become available to avoid any degradation.

Each of our fish and wildlife species must coexist with other land or water uses.



We have not and will not advocate a single-use philosophy. I must admit that it may appear that way, but only because we have seldom been in the planning stages of any profit oriented project in the past. Every time anyone disturbed the soil, polluted water or the air, it adversely affected fish or wildlife and we made ourselves heard. We make no apologies for what must have appeared to some of you as a meddlesome, obnoxious, busy-body attitude; it was our contribution, and we firmly believe it was the biggest one, to the new land ethic becoming a reality.

Large blocks of clearcutting (excessive in some drainages), sagebrush eradication, water pollution, air pollution, misuse of pesticides, improper land development, flood plain development, poor land management (especially where overgrazing occurred), irresponsible water management, poorly planned road or bridge construction and draining of wetlands, have all occurred in Montana and have received our derogatory comments, because each had an adverse effect on the environment of fish or wildlife.

The phrases "adequacy of resource", "population", "options we may lose in the future due to scarcity", all indicate a statement on the present status of the resource values the Department of Fish and Game is responsible for, is in order.

Montana big game hunters rank the mule deer as number one in popularity and total harvest. Mule deer are the most widely distributed species of big game in Montana. Several times during the past hundred years muley populations have peaked, but the year-to-year population, and harvest averages we have been experiencing for the last twenty years far exceed the numbers present at the turn of the century.

Eighty percent of the hunters taking to the field bag a mule deer. We could increase this success ratio but we believe, and history substantiates our theory, that if game is too plentiful there is no longer a challenging goal that is necessary to every serious hunter. Factors regulating mule deer numbers are: adequate harvests to avoid deterioration of their winter ranges, conflicts for forage with livestock, elk and whitetailed deer, rancher tolerance on private land, and damage to crops. Mule deer are presently underharvested in many areas, and the future is bright if we can stave off the feeling that nonresidents should be banned from hunting here; we need them in eastern Montana at least.

Whitetailed deer are a resource that desperately need an expanded harvest. Far greater numbers than we are presently harvesting could be taken. For some reason, Montana hunters almost shun this species. Perhaps it is because they are difficult to hunt and seldom give anyone a standing shot. They are plentiful, their range includes most of Montana's timbered or brushy habitat, but only about 25,000 a year are harvested. We have a chronic problem of obtaining an adequate harvest on most of their ranges. They have the ability to adapt to a variety of conditions and what we need most are more good hunters. They are in conflict with other uses in many areas and additional hunting pressure is needed.

Elk are Montana's most prized big game animal and Montana is one of the most important elk hunting areas in the nation. Originally a plains animal, they have survived only in remote, relatively inaccessible regions away from man's activities. Whether it was the plow or the cow is unimportant, the fact remains that the habitat has undergone drastic changes and elk have survived

only where the habitat remains relatively unaltered. Hunters presently harvest 12,000 to 15,000 elk each year at the 15% to 20% success ratio and practically all of the 80,000 purchasers of elk permits are screaming for more elk.

Changes in land use and a return to grazing lands from plowed fields have widened their distribution pattern, but rancher tolerance of elk in competition with livestock will always be a limiting factor. Their future is brightened by a change in forest management practices, especially the closing of some logging roads and advocating smaller clearcuts; but to significantly increase their numbers we must provide them with winter and spring habitat--in this country that means six months of the year. Thus, if we are to increase our elk herd we must recognize that it may be necessary to provide forage now being utilized by other animals and a choice of resource values must be made. Additional elk ranges will increase numbers but cost will be a limiting factor.

Stockwater ponds in central and eastern Montana were built primarily to distribute livestock for better range utilization. The fact that antelope flourished and multiplied by being released from the restricted ranges governed by a very few water holes, was truly a windfall to the hunters of Montana. We are presently harvesting approximately 20,000 antelope each year. Antelope are dependent on sagebrush for winter forage, thus any control program of sage becomes a threat to the numbers. However, for the foreseeable future, their numbers are more likely to be limited by rancher tolerance of antelope and the hunter. Each year we have a real problem of convincing our resident hunters that they would always be successful in getting a permit if they would apply for southeastern Montana. However,--thousands of hunters continue to apply for central Montana areas and the season is always underway before all

of the southeastern permits are taken up; some areas are never fully subscribed.

If anyone were to ask a game warden in western Montana how many black bears he had, the answer might be "too many." He is constantly plagued with trapping and transplanting nuisance bear during the summer months. We are harvesting over a 1,000 black bear each year, but we would like a larger harvest and certainly it would not strain their reproductive potential. Like whitetailed deer, we've tried everything to encourage bear hunting, especially where we must trap and retrap nuisance bear all summer long, but all to no avail.

Grizzly bear is that magnificent animal that everyone wants to protect in someone else's bailiwick. For years we have been told and have assumed that the grizzly preferred the isolation of the wilderness and to some degree this may be true. Man, throughout history, has taken steps to eliminate an element of his environment if he fears for his own safety. Very few men have been known to coexist in the close proximity of a grizzly for any lengthy period. Thus, I question whether the bear really objects to coexistence as much as man does. Let a grizzly show up near a man's cabin or his livestock or even his temporary camp and in a day or so the grizzly becomes a casualty.

Montana has the only sizeable grizzly population in the 48 contiguous states, mostly because we have large areas where man seldom competes with him for space. The hunters and grizzlies have remained in a stable situation for many years and the hunter success of 400 to 800 hunters remains at about 25 grizzlies per year. The administrative kill by ranchers, government trappers, cabin owners, wardens and others, with or without justification, have usually exceeded the legal harvest. The problem is always the same--when man and grizzly are in competition for the same habitat, the bear loses.

Without constant vigilance by Montana sportsmen, the grizzly may have long since yielded to man's conveniences, sportsmen have traditionally condemned any work of man that destroyed or decreased grizzly habitat. Some concerned, but uninformed citizens, contend that a moratorium on grizzly hunting is needed until it is proven that present regulations are not endangering the bear's existence. But department information on hunter harvest shows that more restrictive regulations are not needed. Rest assured we would be the first to curtail hunting if, indeed, grizzlies were truly endangered by hunting. Existing grizzly habitat supports only so many bears and no more --and this is probably the reason for the high "administrative" kill of bears. Without a hunter harvest, the bear population will experience a normal, annual increase together with increased strife between bears. This can only mean an increase in "administrative" kills as bears seek new ranges and are shot as rogues, marauders, stock killers and campground nuisances. Population losses would occur anyway to meet the dictates of the habitat. No, the future of the grizzly is not endangered by the sportsmen but by those who invade his domain and refuse to allow him to coexist with them. Really, I guess his future depends on us--on our ability to determine where the bear will have a priority. We have already reduced his habitat from the early days when he was found throughout Montana to a few isolated mountain areas. Our ability to restrict our activities in grizzly habitat by regulation, or by land-use zoning, or a new land-use ethic, and to observe moral responsibilities--will determine the grizzly survival.

We are harvesting 600 to 700 moose each year by special permit. For some reason, special permit hunters demand a higher rate of success than

other hunters. This may be partly due to a higher price or the seven-year limitation, or perhaps it is a result of the popular myth that if we are issuing special permits, we must know exactly how many animals will step into the sights of the hunter. Before making any predictions on future moose hunting opportunities, we must develop a better census technique.

Bighorn sheep, one of North America's most prized trophy animals, are harvested annually in Montana at the rate of 60 to 75 per year with a fairly high hunter success rate. Very careful planning will have to go into any increases of bighorn herds as they never will be popular near domestic sheep ranches. Priorities will have to be established on both private and public land when bighorns are discussed.

Mountain goats, with some help from our trapping crews, have expanded their range over the past 30 years and we are harvesting nearly 300 each year --several times the number harvested 25 years ago.

Montana's native upland game bird resource is another instance of abundance with little hunting pressure. Montana hunters take around 100,000 sharptails, 50,000 sage grouse, and 150,000 mountain grouse annually. Those who hunt birds enjoy this state's abundant native game bird resource to the fullest extent. Generally, we provide very liberal seasons--again due to the fact that hunting pressure is less than a hunter per square mile. For future recreation the sky is the limit if we continue to improve our land-management practices. We could accommodate a great deal more hunting pressure and more quality bird hunting opportunities, if we can improve landowner-hunter relations. The future of grouse populations, as with everything else, depends on our land use activities. Single use 'cure-all' practices such as sagebrush control,

designed to treat a symptom rather than a cause, will have an adverse effect on sage grouse. The story isn't much different for sharptails. This bird thrives where grazing is moderate and other forms of land use are not strained to the limit. For mountain grouse, the future depends on forest management practices; overgrazing will be a limiting factor.

For our other upland game birds, pheasant, Hungarian partridge, and wild turkey, all exotics, the picture is similar. In the case of pheasants, their introduction in Montana came sometime before 1895. By 1926, they were abundant in many areas, and 1927 saw the first hunting season. In the past decade, the pheasant harvest has decreased due to changes in Montana's agricultural patterns. And with this bird, you can readily see what I've been talking about in terms of the influence of land uses on wildlife populations. With pheasants, changing land uses from the type they need for survival to more intensive use, has brought about a drastic decrease in pheasants. The prime habitat of past years, which included irrigated grain bottomland, that were not as weed free as today's fields, changed during the last decade--grain has been replaced by irrigated alfalfa, cows are eating fence row cover, and the result has been a rather marked decline in pheasant numbers. Other adverse factors, such as widespread use of pesticides and herbicides have also undoubtedly affected pheasant reproduction.

The only other game, aside from fish, that I haven't mentioned as yet are waterfowl. Here, the picture in Montana is increasingly bright due to an increase in waterfowl habitat over the past several years, and a bright outlook for the future.

Of all the species utilized by sportsmen for recreational purposes, none can match the fish for his biological potential to continue reproducing his species. The biological potential of fish ranges from several thousand eggs from a spawning female trout to several hundred thousand from the spawning female paddlefish. Obviously, not all of these eggs can ever survive to an adult fish of interest to an angler; however, it does demonstrate the biological strength of the various species.

To utilize this natural potential and capitalize on its value, it is absolutely imperative to protect the habitat to meet the spawning needs of the fish.

Where these needs cannot be met, such as lakes and reservoirs, capable of sustaining trout but not reproducing the species, our hatchery system fills the gap. However, as popular as hatcheries are, we still recognize the fact that the natural habitat that has sustained our trout populations throughout the centuries still produces the vast majority of fish creeled by anglers.

We have yet to demonstrate anywhere in Montana that angling has depleted a trout population to the point where it could not renew itself if the spawning criteria have been met. In fact, data we have gathered indicates that Montana anglers are only scratching the surface. It is highly unlikely that angling pressure will ever be a limiting factor in Montana fish populations. If in some specific areas it is ever demonstrated that it is, we have ample regulatory authority to rectify the situation.

If there is one type of fishery that each day becomes more and more unique to the State of Montana, it is trout fishing in flowing streams and rivers. No state in the nation can match Montana for its trout stream



fishery resource. At the same time, nothing attracts humans in the arid west in greater numbers, with possessive intent, than do flowing streams. Unfortunately, basic laws of physics demand that all things must flow downhill--consequently all the collective effluents from man's activities in the State of Montana eventually must reach a stream somewhere. Our ability to provide for the future, therefore, pivots on our ability to clean society's effluents and control human activity as it relates to preserving the trout stream environment.

At the present time we have some excellent tools to work with--a good Stream Preservation Act that perhaps needs some expansion, a Water Pollution Control Act that is designed to work, and some very good nondegradation language in the Water Quality criteria. Still uncontrolled, and a very real pollution threat, is rural subdivision, but hopefully the legislature will soon address itself to that most nagging problem. It is certainly a shame that man feels an overpowering need to possess, for himself as an individual, that which he values, for in trout stream habitat preservation, history has shown man generally destroys that which he values most.

Due to the time element, I'm not going to dwell on boating, snowmobiling, skiing, backpacking, rock-hounding, and the vast array of other recreational pursuits that should be included in this inventory. Suffice it to say that all of these have their place, and all have to be considered as legitimate uses of land and a pursuit of happiness.

There is a flicker of optimism for the future because it appears we are all becoming more aware of each other's needs. If every resource value is given adequate consideration before an irreversible downward trend results from single use priorities, we will forever be blessed with the ability to make a choice.

## WILDERNESS AND OPTIONS

by R. Duane Lloyd  
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Presented by E. L. Shafer

Including the Wilderness resource in this symposium is most appropriate. There are within the National Forests of this State six units of the National Wilderness Preservation System with a total of 1,722,567 acres. An additional 417,802 acres are in four Primitive Areas being studied for inclusion in the System. If Congress chooses to add these four areas to the National Wilderness Preservation System, over 2.1 million acres of the 16.7 million acres of National Forests in Montana will be dedicated as a Wilderness resource.<sup>1</sup>

This estimated potential of over 2.1 million acres of National Forest Wilderness in Montana would be:

12.6 percent of the National Forest land in the State,  
2.2 percent of the land area of the State, and  
about 14 percent of all National Forest Wilderness  
Primitive Area acreage in the Nation.

The potential is even higher than this though. Within the National Forests in Montana are many roadless areas of over 5,000 acres that are being reviewed and considered by the Forest Service and discussed with the public.

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<sup>1</sup>Some additional acreage within Montana, administered by the National Park Service and the Bureau of Sport Fisheries and Wildlife, may be designated as Wilderness by Congress.

Some of these probably will be designated for formal review and study as potential additions to the National Wilderness Preservation System.

Thus Montana, with only a small proportion of the Nation's population, has--and can be expected to have--a large share of the Nation's Wilderness resource.

Montanans have comparatively ready access to Wilderness for direct use and enjoyment--and they will be hosts to many other Americans attracted to Montana by Wilderness.

#### WILDERNESS VALUES

Perhaps more than any other natural resource, Wilderness is a national resource. By law Wilderness is preserved as an "enduring resource" for the "use and enjoyment" of "The American people of present and future generations." Some will come, visit, and experience these areas personally. Others will enjoy them vicariously through photos, books, and reports. Still others will get satisfaction from Wilderness in Montana primarily in terms of existence value and option value (Tombaugh, 1971); that is, just knowing that the wild open space and natural conditions are there and are being maintained so that one can visit them--and he sometimes decides to do so.

Wilderness in Montana (as everywhere) is of important national interest in terms of basic scientific values (Franklin and Trappe, 1968), nature preservation, primitive recreation opportunities, and both direct and indirect aesthetic satisfactions (Hendee, 1970). Thus citizens in San Francisco, Atlanta, or New York City have as much "say-so" about the Cabinet Mountains Wilderness, as do those who live in Missoula or Libby. Intense nation-wide interest in wilderness preservation is one of the factors contributing to the

liveliness of the current political struggle that will determine how much Wilderness there will be and where it will be located.

#### WILDERNESS CONCEPTS

So far, I've been talking about Wilderness (with a capital "W")--meaning areas designated by Congress as part of the National Wilderness Preservation System under provisions of the Wilderness Act of September 3, 1964 (P.L. 88-577). One of my assignments is to define wilderness and contrast popular and legal definitions.

An assignment to discuss wilderness is difficult--and sometimes even hazardous--because of the lack of commonly accepted concepts and definitions.

Nash (1967) has examined the problem at length. We can benefit from some of his findings:

"Wilderness" has a deceptive concreteness at first glance. The difficulty is that while the word is a noun it acts like an adjective. There is no specific material object that is wilderness. The term designates a quality . . . that produces a certain mood or feeling in a given individual . . . Because of this subjectivity a universally acceptable definition of wilderness is elusive. One man's wilderness may be another's roadside picnic ground. . . . the number of attributes of wild country is almost as great as the number of observers. And over time the general attitude toward wilderness has altered radically. Wilderness, in short, is so heavily freighted with meaning of a personal, symbolic, and changing kind as to resist easy definition.

Given these problems, and the tendency of wilderness to be a state of mind, it is tempting to let the term define itself: to accept as wilderness those places people call wilderness. The emphasis here is not so much what wilderness is but what men think it is. The limitation of this procedure, however, is the way it makes definition an individual matter and hence no definition at all.

Nash's observations are pertinent to our discussions today. I submit that much of the political contention over wilderness policy is due to the

absence of a commonly accepted definition for the many emotionally laden concepts of "wilderness."

Wilderness is much discussed and debated--but seldom defined. Many of the general public tend to consider almost any forested land, without pavement or buildings on it, to be "wilderness." For example, columnist Tom Braden (1972) recently wrote on the topic "Mobs ruining U. S. wilderness." Braden was upset because one of his favorite fishing spots in Colorado has become available to, and used by, "the mob." He used to reach the spot by driving part way and then walking along "an old logging road." Now many people are driving vehicles all the way to that site. He concluded that campers should be confined to public parks; wilderness is diminishing; and "What we have left ought to be preserved for those who are willing to walk to get there." Method of travel and relative freedom from crowding seem to be important criteria for Braden.

Another example was a recent invitation in the Washington, D. C., metropolitan area to "enjoy a wilderness outing amid the splendor of glowing autumn colors at three nearby Regional Parks"--by taking part in guided nature walks of about an hour's duration on trails about two miles long.

Between these broad, loose approaches to the wilderness concept and the strict one in the Wilderness Act of 1964 are a variety of others. The concepts that can be distilled out of the writings of modern wilderness advocates tend to conform generally to those in the Wilderness Act. Emphasis is on the absence of mechanical means of transportation, the presence of exceptional natural scenery, absence of signs of the modern "rat race," such as smog, opportunities for peacefulness and solitude (Norton, 1971, for example), and

the existence of nature in a wild state--". . . life and land forms still relatively unspoiled and undisturbed" (Bayne 1972, for example).

Adventure and challenge; as well as naturalness, beauty, and solitude; are important to many (Hendee, 1970). Robert Marshall (1971) noted that "To countless people the wilderness provides the ultimate delight because it combines the thrills of jeopardy and beauty. It is the last stand for that glorious adventure into the physically unknown."

To some the issues of wilderness preservation focus largely on the spiritual or religious. These people are absolutely convinced that man can survive spiritually and morally only through contact with undefiled Nature. These concepts were prominent with Henry David Thoreau who said ". . . in Wilderness is the preservation of the World," and "all good things are wild, and free." John Muir adopted and preached Thoreau's philosophy extensively. Many people today accept these ideas as valid.<sup>2</sup>

By the time Congress passed the Wilderness Act in 1964 and established the National Wilderness Preservation System, Americans had developed a strong wilderness tradition and a vocal minority of fervent wilderness advocates.

Congress, in the Wilderness Act (Section 2(c)), provided criteria for and a definition of Wilderness:

A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have

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<sup>2</sup>See Nash (1967), chapters 5, 8, and 9.

been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Congress' definition of Wilderness was primarily a codification of the most important elements of the American wilderness tradition that had evolved during the prior 100 years. But passage of the law did not end debate. There still is underway a lively debate over the meaning of the definition in the Act. For example, the Wilderness Society, the Sierra Club, and some others accuse the Forest Service of interpreting that definition too strictly--with too much "purity."

#### PRESERVATION VS. RECREATION

Tradition and the Act both call for Wilderness to serve two objectives: (1) Nature preservation and (2) primitive recreation. I submit that the intertwining and confounding of these two objectives is a fundamental source of friction and misunderstanding in today's debates over Wilderness.

In earlier times when there were fewer people, and a smaller proportion of them were wilderness fans, nature preservation and primitive recreation commonly were compatible goals. But the population has grown; wilderness advocates have proselyted thousands to the faith; backpacking and related primitive recreational activities have "caught on": and wilderness organizations and the Forest Service have successfully convinced us that Wilderness areas belong to all the people and that we should visit and enjoy them (McArdle, 1959; McCloskey, 1972).

As visitation to a Wilderness increases, the recreational objective begins to conflict with the preservation objective, and additional visitors also interfere with the aesthetic and recreational satisfactions of one another. Too many visitors threaten the integrity of the ecosystem (unspoiled nature). Too many visitors collectively destroy the solitude they seek individually in the wilds (Lime and Stankey, 1971; Taylor, 1972).

As early as 1937 Robert Marshall (1971) commented that some wilderness areas were overcrowded. Thirty-five years later some areas are visited so heavily that there is serious question of whether they are, in fact, still wilderness. In 1970 the Sierra Club, concerned about the possible hazards of growing use in the Wildernesses, established an Impact Study Team to develop a scientific basis for ways of minimizing the effects of individuals and groups on wildland areas (Hartesveldt et al, 1971; Stanley et al, 1972).

The Forest Service established a Wilderness Management Research Project, with headquarters at Missoula, Montana in 1967. Scientific studies designed to unravel the problems of social and ecological carrying capacities of wilderness are among the most important in this project (Lucas, 1971; Stankey, 1971).

Rationing visits to Wilderness already is a reality in some places and may become a common management practice (Taylor, 1971). This reality is one acknowledged reluctantly and regretfully by all of us who have treasured our personal freedom to seek interludes of "primitive and unconfined" recreation in the Wilderness (Bowen, 1972).

The growing popularity of Wilderness for recreational visits is one (but only one) reason for the intense concern by wilderness advocates for



establishment of new Wildernesses.

I submit that growing popularity poses serious threats to our valuable Wilderness resource because we have confounded the nature preservation and the primitive recreation objectives, and because we have failed to seriously consider and pursue the options.

#### OPTIONS

The nature preservation needs (including scientific, aesthetic, and religious) can be met by a combination of Wilderness areas and Research Natural Areas<sup>3</sup> if recreational use of Wilderness is limited and carefully managed.

In contrast to the nature preservation objective, the primitive recreation objective, for many people, can be met outside dedicated Wilderness areas. In fact for many people their needs can be met better outside Wilderness!

Scientific studies of Wilderness visitors have shown that they have a variety and a gradient of objectives, desires, and preferences for environmental conditions and experiences (Hendee, et al 1968; Lime, 1969; Lucas, 1964; Stankey, 1971). Only about half of the visitors to four Wilderness areas studied recently had wilderness concepts and values that corresponded closely to the criteria in the Wilderness Act (Stankey, 1971). For some an encounter with unspoiled nature is a necessary part of their primitive recreation experience. But not all who want solitude or a remote area camping experience need or want a natural environment uninfluenced by man. Not all who want to journey in unroaded areas seek solitude. Indications

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<sup>3</sup>Recreational use of Research Natural Areas (RNA) is prohibited. RNA's are dedicated exclusively to nature preservation and scientific purposes (Franklin and Trappe, 1968).

are that many who now visit the Wildernesses do so primarily for recreation purposes and choose a Wilderness because of a shortage of suitable alternatives--or a lack of knowledge of where such alternatives may exist.

It is helpful to think about the many kinds of recreational opportunities in terms of a variety of options along a continuum from concentrated to dispersed types of use. The various options can be described in terms of space requirements, desirable frequency of contacts among users, objectives of participants, degree of facility and site development, ease of access, and mode of transportation (See figure 1.). In figure 2, the concentrated-dispersed continuum is shown with some illustrative examples of activities and their relative positions in the continuum.

Wilderness visitors seeking solitude and an encounter with wild undeveloped nature are at the extreme right end of this continuum. For them full satisfaction is possible only in a true wilderness setting. But many others can tolerate or seek more encounters with other people, do not seek unaltered nature, may want fairly easy access, and may want to have more convenience-type facilities available. Their needs can be met by an array of options in the right half of the continuum and just left of the extreme representing pure wilderness.

Society should give priority in Wilderness management to (1) nature preservation and (2) visitors for whom pure wilderness is necessary. The primitive recreational needs of others can be satisfied with alternative resource combinations (Lucas, 1970).

It is unfortunate that we have arrived at this late date without developing positive and aggressive policies and programs to provide a full

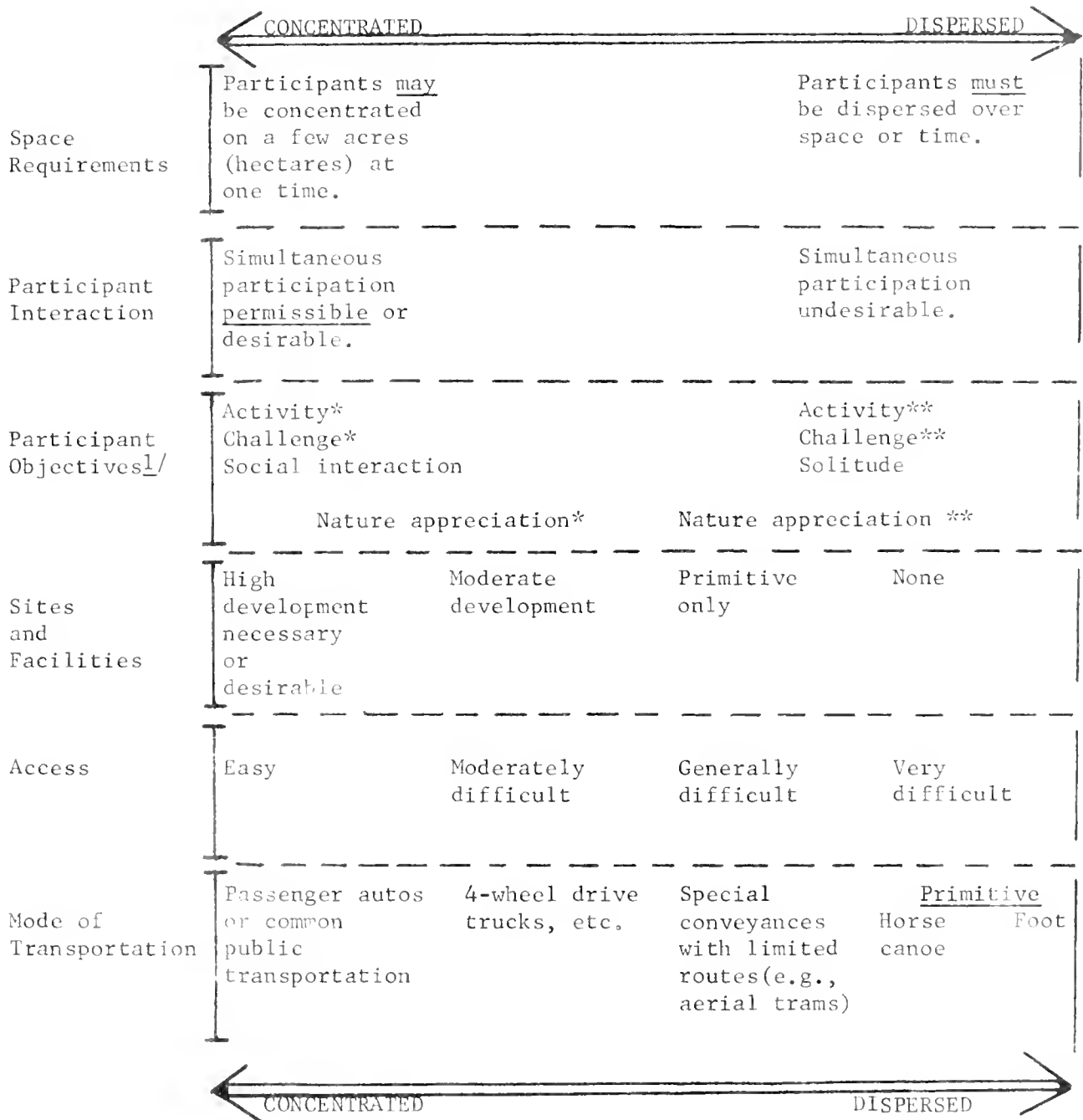


Figure 1.--A continuum of outdoor recreational opportunities from concentrated (highly developed) to dispersed (primitive) types. Wilderness is at the right end of the continuum. A variety of potential options to pure wilderness exist at the right end of this continuum. (1/ Single and double asterisks indicate important differences in the types of activity, challenge, and nature appreciation desired.)

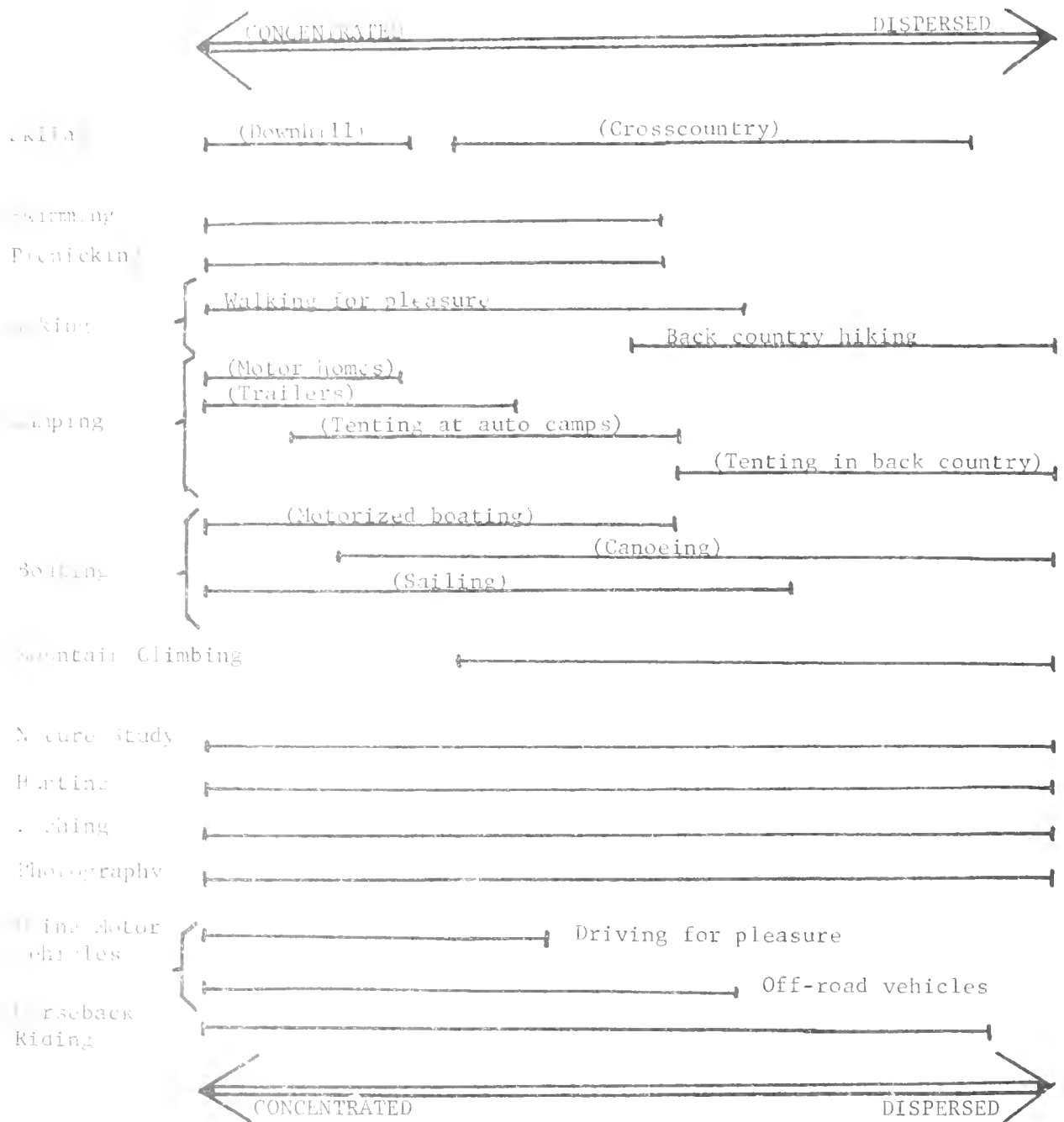


Figure 2.--Examples of selected recreational activities across the continuum of opportunities. Note how many touch or approach the wilderness end of the continuum. There can be optional ways of providing for many of these outside formal Wildernesses.

array of recreational opportunities. We have many opportunities, at the concentrated end of the continuum, for those who travel by automobile and stay close to the road; we have 11 million acres of Wilderness available for primitive recreation; but there is a serious lack of opportunities in between these extremes on the outdoor recreational continuum. The lack of alternative trail systems (Lucas, 1971a) and semi-wilderness type areas seems to be pushing many people<sup>4</sup>, who otherwise might not go there, into formally designated Wilderness areas.

Isn't it about time that we gave serious attention to providing more and better hiking and camping opportunities outside Wilderness? Wouldn't providing for more primitive recreational needs in a greater variety of situations, and in varying degrees of "primitiveness," (1) better serve the public, (2) spread the use around, (3) contribute to prudent management of Wilderness, and (4) help reduce conflict between recreation and nature preservation in Wilderness?

A program for optional types of hiking and remote area camping opportunities should include a variety of levels of development from very primitive (as in Wilderness) to well developed trail systems with shelters or hostel-type facilities similar to those in Yosemite National Park, the White Mountains of New Hampshire, and some areas of Europe.

The idea of providing for more primitive and semi-primitive recreation outside wilderness is not new (See Lucas, 1971a; Lucas, 1970; Lloyd and Fischer, 1972; Spurr, 1966; and Lime, 1969, for examples), but it has not received enough attention, consideration and debate.

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<sup>4</sup>Recent news reports indicate that Americans are buying lightweight hiking and camping equipment at the rate of \$25 million a year (Anonymous, 1972).

## CONCLUSION

The issues of Wilderness and options are only part of the public debates about wilderness. We are in the midst of a continuing political struggle that will further polish and refine American Wilderness policy. Industries and local economies dependent on harvesting of timber and extraction of minerals are contending with the wilderness lobby for control of National Forests and other public lands. Wilderness has become so popular that its integrity is threatened. We need to better balance the opportunities for intensive recreation and primitive-dispersed recreation. More primitive recreation opportunities and nature preserves need to be established closer to major centers of population.

Complicating these struggles are: (1) A variety of philosophic bases for, and concepts and definitions of, the wilderness resource; (2) differences in national, regional, and local interests and points of view on wilderness; (3) the confounding of recreational and nature preservation objectives in Wilderness; and (4) a gap of unmet recreational needs between the Wilderness and the concentrated-developed ends of the continuum.

A major step toward effective protection and management of Wilderness would be to develop an aggressive program providing for a full array of options for hiking and camping in remote areas outside the Wildernesses. This also would provide better for many people's needs not presently met--except poorly by overcrowding Wilderness.

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RANGELAND RESOURCES  
(Grazing Resource)

by

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Montana is made up of rich natural resources, both renewable and non-renewable. Her early history has been one of a search for the elusive pot of gold at the end of the rainbow.

The early trappers and gold seekers tramped across the plains, over the foothills and up the valleys of Montana hardly looking in their rush to make a fortune. Perhaps a few did strike it rich for a short time, certainly a vast treasure of gold and furs were torn from the land in a scant moment of history. But wasn't it ironic that those very people were walking on the true pot of gold, the seas of grass that stood there waiting to be harvested --not once, but again and again for time immemorial to the benefit of everyone.

I must concede that after the first migrations the livestock men were soon to follow with their herds of cattle and sheep to compete for the free grass. The results were bad. In many areas the resource was damaged seriously.

Closely following the stockmen were the homesteaders who plowed the land everywhere possible and again some of the resources were damaged even more severely until people were of the opinion that this was a harsh and barren

land and in many areas not fit for human habitation. It appeared that our state reached the very bottom of condition during the drought of the early thirties. People even prophesied that a majority of the land might remain a desert, not fit for any useful purpose, virtually unable to support any reliable agricultural industry, except perhaps in the river bottoms and in select soil and moisture sites scattered about the State.

Well as we now know, people didn't give up and with this desperate situation, desperate actions were taken. Legislation was passed to create the State Cooperative Grazing Districts and shortly after, the Conservation Districts. High priorities were given renewal programs and experimental projects of the universities and experiment stations. Until today, the combined actions by both the public and private sectors have returned the grazing areas to nearly 50% of their presently known capabilities.

One of the most important developments that occurred during that period of time was the creation of a new scientific discipline, Range Management, which directed its efforts to the protection, development and use of the native grasses and the lands that produced them. Range Management courses were developed and offered in the college and university for those who wished to take the general or broad approach for agriculture and forestry as well as the individuals who were concerned enough to want to specialize in such a new field as Range Management.

During the last quarter century volumes of data have been gathered, basic truths were considered and stable ownership patterns of the land were established. This led to the maturing of the thinking of the people affected by the grazing industry and a realization that something larger than the simple grazing of

every year of grass was the logical thing to do.

In June of 1970 under the leadership of the State Conservation Commission, from a request stemming out of the Hill County Conservation District, a select group of interested individuals representing public agencies, private organizations and private individuals developed the Montana Rangeland Resource Program.

The Program addressed itself to the recognition of some extremely important facts. First and foremost being that rangelands are a definite kind of land that produces grass in its native state in the same manner as forest lands produce trees with or without the presence of man. In addition the rangelands are an important source of Montana's water and must share the responsibility for its condition.

A large percentage of the wildlife depend on these lands for food and habitat. The rangelands have a great potential for supplying recreation in a wide variety of forms for our ever increasing population. Also, erosion and pollution control as well as the important aesthetic values must be recognized as responsibilities of the rangelands.

Perhaps the most astonishing fact to come from the development of the program is that approximately 70% of the state of Montana is either rangeland or grazable timberland which is the primary base for the livestock industry, the largest single dollar producer in our economy. Today Montana's livestock industry produces nearly 500 million dollars each year for our general economy.

The conclusion was that the rangeland resource needed recognition. Therefore, coordinated development was written into the program in the form of goals and objectives and a plan of coordination of efforts at state and county level.

The goals are basically recognition of the rangelands as a kind of land, the increase of the economic and other intrinsic values of the range and the

coordination of the large number and widely diverse interests and responsibilities of these range lands.

Six basic objectives were developed to be accomplished in a period of ten years. These objectives are to have 80% of the rangeland under some form of planning; 50% of the native ranges will be in excellent condition and 30% in good condition; native range and pastures will be producing 40% more usable forage; 80% of the native ranges will have stockwater fully developed, plus the remaining 20% being developed; recreational use of the range grass will increase by 500%; and the wildlife habitat on native ranges will be improved to provide a more stable wildlife population. Upon completion of these goals and objectives, it is anticipated that great additional economic benefit will result for Montana.

It has been proven by the Soil Conservation Service that an increase of one condition, such as from fair to good condition range, that a dollar potential of over 100 million dollars annually at today's prices can be gained from the livestock grazing alone.

Income from recreational activities have been projected with startling results, we can only guess how large this will grow to be. The only estimate that can be made at this time is that it is reasonable to consider a potential doubling of current income in the future if reasonable planning is accomplished.

Net income comes in two forms either by making money or saving it. Nearly complete erosion and pollution control on 70% of our state will save a great deal of expense such as the dredging of city water supplies and the replacing of washed away roads and railways. Therefore, in a sense, making money available for other purposes.

There is a different value to an attractive countryside, perhaps this will never have a true dollar value; but it certainly does exist.

The Rangeland Program has been well received. Since the final draft of the original program was approved, major state and federal agencies and private individuals have worked hard to gain its implementation, as rapidly as any major program in recent years.

The Program was approved by resolution during the last session of the State Legislature and funding was given to the Conservation Commission for staffing, travel and office facilities. Upon the creation of the Department of Natural Resources and Conservation under the Reorganization Act of 1971, the Rangeland Program is now in the Grass Conservation Bureau with the former State Grass Commission - an excellent arrangement.

The first phase of implementation is nearly completed with the appointing of Rangeland Program Leaders in nearly every county in the State. This will be the nucleus of a coordinating action group of over 60 individuals representing Conservation Districts and other organizations working to gain the goals of the Program.

Perhaps the largest single concern at this point is conflict of interest between users of the rangeland. With the use of good quality land use planning instigated and promoted from the grassroots level, there is no real basis for concern.

Scientifically applied range planning as we are capable of doing today can compensate for nearly all problems in the multiple-use of these lands. There is no reason for the discontinuance of one method of use to allow for another. What is more appropriate is to plan for the whole with the resulting

total advantage to everyone.

Ranchers operating with more animals per unit, a good clean reliable flow of water plus the enjoyment of the finer things in life such as an abundance of wildlife, natural beauty and recreation in the rangelands of our fabulous state; this will be the reward for comprehensive land use planning of the Rangeland Resource, undoubtedly the largest most underdeveloped and the most potential segment of our vast inventory of natural resources.

## THE TIMBER SITUATION IN MONTANA

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## INTRODUCTION

Last year the National Forests of Montana produced approximately 676 million board feet of wood products, about 19 million acre feet of water (67 percent of the State's streamflow), and hosted 1.5 million visitor-days of recreation use. Fifteen percent of the Nation's wilderness acreage is in Montana; in addition to this large amount of acreage, 650,000 acres in four primitive areas are being reviewed to determine suitability for addition to the Wilderness Preservation System, and five million more acres are included in the current Roadless Area Review. These are impressive statistics, but they suggest some impressive problems. For instance, some recreationists don't like timber cutting; likewise, some timber producers don't appreciate wilderness enthusiasts' advice as to where timber harvesting should be allowed. We now face a host of conflicts created by the increased demands upon our National Forests.

This isn't news to those who are closest to the source, i.e., those who live in Montana either experience or hear about such conflicts almost daily. Using these conflicts as a general background, I propose to briefly



discuss the general problem we must face to successfully manage and harvest timber in Montana. Also, I will suggest some helpful steps we may take to gain the desirable short-term and long-run goals.

#### THE PROBLEM

Briefly stated, Montana's current timber problem stems in part from the additional concerns for environmental quality and amenity values. These concerns highlight the need for an improved knowledge base from research and also a new level of management, both of which are currently inadequate to meet the material and service needs of our society.

Although national goals are changing and causing an increased demand for amenities, this has not decreased the need for commodity goods from our basic forest land resources which are becoming increasingly scarce. All of these changes have emerged from a background of concern about environmental health and social values.

During the past 10 years, the National Forests have been offering and selling from 90 to 95 percent of the allowable harvest. However, in recent years the percentage offered has been dropping due to several reasons, such as: lack of main access roads; lack of markets for some products in some areas; some sales are offered but not purchased; increased costs and manpower requirements in sale preparation; and increased effort to avoid environmental impacts. All of these tend to reduce the volume actually sold.

Stumpage prices have increased by 33 percent between 1960 and 1971 (as measured in 1967 dollars) due to: less stumpage being offered for sale; a declining supply of old-growth softwood timber; inflation; and other factors.

The problems of the National Forests in Montana are typical of those occurring in other Forests throughout the United States. While installed mill capacity in Montana remains fairly static, public timber sale offerings are being revised downward. On some land, only nontimber uses are now permitted as a result of concern over changing social and environmental values. This includes land permanently removed from the timber production base as well as land where harvesting has been modified along scenic highways and fragile areas of unstable soils. The net impact upon Montana's National Forests has been a declining sales program since 1970.

Consumers typically respond to higher timber product prices by either consuming less wood or purchasing more wood substitutes. Both of these responses have social implications. For example, a recent Saturday Review article disclosed that a significant proportion of our Nation's families are doing without softwood products, namely houses; they can no longer afford the traditional single-family dwellings. Even though higher softwood prices have not accounted for the lion's share of the increasing cost of housing, these prices have added to the problem.

The shift to substitute materials can have an adverse effect on the timber-dependent economies of Montana. When consumers shift to nonwood products, timber-dependent jobs and the economic activity they support will be lost. In this regard, a report recently published by the University of Montana's Bureau of Business and Economic Research merits attention. This report estimated that one in eight jobs in the State are dependent upon the wood products industry. Timber dependency is even greater in western Montana where two in five jobs are generated by the wood products industry. The

implications of future decreases in timber production are obvious.

Shifting to wood substitutes results in environmental as well as social costs. Wood is renewable; most wood substitutes are not. Production of substitutes requires more units of energy than wood. For example, it takes 20 to 30 times more energy to produce aluminum than it does to produce lumber from wood. Furthermore, wood is biodegradable and can be recycled.

In 1971, Montana counties embracing National Forests received a little more than 4.1 million dollars from the 25 percent National Forest Fund. These in-lieu payments to counties are linked to market conditions, the amount of timber cut, and stumpage receipts over a period to time. It follows that reduced timber harvests mean less support for schools and other public services. Thus, counties already burdened by welfare costs associated with both the under-employed and the unemployed timber-dependent work force face a potential dollar crunch.

Although I have only cataloged the major dollar costs to Montana of a reduced timber production, it is important to recognize that these dollars also reflect human costs. The dislocations of families and even of entire communities must also be considered as a cost.

The probable scarcity of materials and energy and the growing concern for environmental quality underscore the importance of continuing efforts to improve the future timber supply situation.

#### IMPROVING PRODUCTION POSSIBILITIES

Assuming that our current timber production is less than the amount we could produce, let's look at some ways to increase production.

### Short-run Opportunities are Limited

Timber growing is a long-term process and therefore it is not reasonable to consider massive investments as a means of increasing the harvest of timber in the short-run. Growth response simply takes too long. In Montana, so far as we know at this time, we have no opportunity to introduce silage forestry; we cannot plant and harvest on two or three-year cycles as is being done to a limited extent in the south. Furthermore, so far as we know, we have no substantial opportunity to use fertilizers for short-term benefits.

Utilization.--If we cannot quickly grow more wood on the acres we are now managing for timber, what is left? Our greatest shortrun opportunity is to utilize more of the wood already available on these areas under our management. Currently we estimate that we harvest only about half of the wood fiber. The rest we either leave behind or burn because it is too small or because there is no local market in Montana and national markets can't be reached because shipping costs are too high. Even after allowing for the loss of twigs, roots, and cull materials we estimate we could increase production substantially if we could develop more efficient extraction, processing, and transportation systems that are compatible with today's environmental and social concerns. For example, the amount of wood fiber, four inches in diameter, and larger, that is not utilized on timber sale areas in Region 1 National Forests is estimated to be 7 million tons each year. Small poles and standing dead trees represent an estimated 6.6 billion board feet not merchantable according to today's utilization standards.

Current research by the Forest Products Laboratory at Madison, Wisconsin, indicates that it is now technically possible to manufacture structural

particleboard from logging residues and other materials that are now either wasted or unused. Much sawtimber could be saved if particleboard manufactured from such residues could be substituted for plywood. Current expansion of particleboard production in Montana provides immediate opportunities to capture much of this "other half" of the State's "woodpile."

Taking into account the current and prospective constraints on increasing the timber harvests on federal lands, the improved utilization may be the only major viable option that is open for short-run purposes.

There is considerable promise for extending softwood timber supplies within a short time by improving lumber recovery in existing mills. Approaches that would be useful for industry include: (1) upgrading mill facilities, including installation of computerized equipment just now emerging from research and development efforts; (2) analyzing individual mill operations and implementing changes and improvements; and (3) upgrading maintenance competence of sawmills by training and employing skilled electronic and other technicians capable of handling computerized mills.

Short-run relief could also be accomplished by providing more funds and interdisciplinary professional manpower for multiple-land-use planning; thus, additional volumes fully compatible with protection of environmental quality could be offered for sale. The Forest Service is firmly resolved to do a high quality job of resource management on the National Forests. Nowhere is that challenge more acute than in the arena of timber harvesting and environmental protection. Such high-quality management costs money. Inadequate funding and a shortage of interdisciplinary professional manpower has led to less timber being sold than is warranted by the productivity of the

forest. If more funds were available, the cut could be increased while ecologically-responsible management could be continued.

Another option would be to extend harvesting to areas that are now in a reserve status because of some limiting condition (such as unstable or shallow soils) that cannot be accommodated to the present harvesting technology. To this end the Forest Service has inaugurated the FALCON (Forestry, Advanced Logging and Conservation) program to develop techniques for timber harvesting in those ecologically-fragile areas that require reduced road density.

In the west, use of newly-developed logging activities has already demonstrated the potential for delivering softwood logs by helicopters, balloons, and advanced skylines. More than 100 million board feet of sawlogs will be harvested by these systems in calendar year 1972. Once the FALCON program gets underway, this harvest could be doubled in the following seven months. Increases from programmed harvesting will occur both in the far west and the interior west. FALCON will also provide harvest systems for salvaging more fire-, insect-, and disease-killed timber.

Planning is now underway for an initial FALCON program involving helicopters and advanced skylines on the Coram Experimental Forest located near Kalispell, Montana. Multi-disciplinary teams will conduct research and demonstrations both on the efficiency of these systems and on their compatibility with the environment. Detailed studies on the ways the systems influence regeneration, nutrient cycling, wildlife, and aesthetics are now in the planning process. Any major effort will involve (a) several different methods of treating logging and natural residues, (b) the costs of removing materials, (c) possible utilization of residues, and (d) on- and off-site evaluations of

environmental impacts.

#### Long-run Possibilities for Increasing Timber Production

When we change our focus to long-run possibilities for increasing timber production, there are more opportunities to explore; we are currently researching, developing, and implementing new practices which will eventually provide significant increases in timber production. The most obvious of these opportunities is intensified forestry cultural practices--a viable means for increasing productivity.

Before exploring problems of particular significance, we must consider the major reason that causes increased productivity to be so important. If management is not intensified on our more productive acres where land is suitable and available for timber production, then the only remaining way to increase timber production is to encroach upon forested areas that are already preempted by competitive uses. This latter action, of course, would generate more conflict in such areas; this, alone, seems adequate reason to intensify timber production efforts on acres already committed to timber production. These are lands that either have been, or will be, subjected to classification, multiple-use planning, and allocation through public involvement processes.

Timber management in Montana is now, and will be for several decades to come, geared to converting existing stands to more vigorous, producing forests. In the state there are millions of acres devoted to timber production which are covered with either slow-growing or stagnated stands, or both. It is only as we open or replace these stands that we will begin to realize

the inherent productivity of our forests. We do not know the total acreage treatable, but we do know that out of a total of 9.6 million acres of commercial forest land on national forests in Montana, approximately 2.6 million acres need precommercial thinning. An additional 2.6 million acres need access as well as commercial thinning.

Unfortunately, we have little empirical information about the physical response of forests to intensified management. However, despite having to walk on thin ice, I'd like to speculate as to what might be achieved.

Case history experience from both precommercial and commercial thinning suggests that increases in usable fiber ranging from 25 to over 200 percent are possible throughout substantial areas. Industrial claims suggest that a 30 percent gain may be obtained from fertilization--personally I'd feel more comfortable with, say, a 10 to 15 percent gain. In the Pacific Northwest, I know a geneticist who, when put on the spot, figured that his breeding program might eventually increase yields by 10 percent. Forest industry in the Pacific Northwest predicts potential gains through genetic improvement at 25 percent; Montana's potential is probably somewhere within this range.

Opportunities to reduce losses due to insects, disease, and other sources are great. Currently, combined losses are estimated at 61 percent of the state's annual production. How much these losses can be economically reduced is a big unknown, particularly in light of the fact that many of our traditional chemical control measures for dealing with insects and diseases have been eliminated from our kit bag by our environmental concerns. However, we do know that integrated silvicultural-pest management programs can make a substantial contribution toward reducing these losses in the long-run.

Inherent productivity is a useful concept, but perhaps it is passe in this day of jets and atoms. If we want to speculate about the possible future



of our forests we can talk about the wonders of tree genetics and fertilization, the implications of disease and bark beetle control, logging balloons and helicopters that will treat the land gently, and computerized systems that will help land managers do a better job. The wonders all around us suggest that in the long-run we will surely overcome our biological limitations; this may occur in ways still unknown to us today. But what of the limitations on timber production that are not biological?

#### Timber Production Problems Are Not All Biological

I have emphasized the advantages of reducing use conflicts by concentrating timber production on as few acres as possible. Foresters generally agree that concentrating on the most productive sites is also a good economic policy. For every dollar that is invested, we generally expect the highest dollar return. However, this concept of concentrated production poses some serious questions, especially for public forestry.

We don't have all of the answers about the impacts of timber production activities. While good management will enhance each of the values of the forest, we must pay a price for poor management. For example, good timber management practices can protect and maintain the high quality water of our forests, but poor practices can cause degradation of water supplies. Although harvesting can provide a diversity of forest conditions beneficial to wildlife, practicing monoculture (managing for single species over large areas) can reduce many wildlife populations. Erosion and smoke pollution are evidence of environmental degradation but must be balanced against the possibilities of spoil-bank reclamation. Timber management provides a means of supporting

recreation facilities but can destroy the very experience that visitors have traveled to the forest to enjoy. Even economically, timber production can be a two-edged sword: jobs can be created, but they can be lost in boom-and-bust cycles. The problem for the forest policy-makers is how to get the "good" without the "bad."

Intensive forestry is expensive and costs must be viewed over the long-run. It may be that such investments will pay well, eventually; but there will be a delay. To date, the Federal government has not been willing to invest the necessary funds in this kind of management. The chief result has been a series of lost opportunities to stimulate wood production. Until recently we got by on our old growth, i.e., by increasing harvesting when the demand for wood increased. This will no longer suffice--the new demands for responsible management of all the forest resources rule out some of our past practices. The production of more wood in the future is going to require more invested tax dollars.

At a national level we must deal with the problem of providing enough capital to manage and to develop our forests. But the State of Montana is faced with the problem of providing jobs for those in areas preempted for non-timber uses. The failure to continue harvesting, or the failure to begin harvesting, merchantable timber has a price tag: the price is not timber-supported jobs, and no timber-financed payments to counties for schools, roads, or other purposes. All of the available empirical evidence clearly indicates that no other use of the forest can generate job and income benefits comparable to the timber industry.

Does this say that cutting timber is "right?" Not at all. I only emphasize that, as cutting sometimes leads to undesirable impacts on the

environment, a failure to harvest the forest also has a cost.

#### CONCLUSIONS

We need only look around us to verify that something is out of balance in the production of wood. Prices are going up and at times are seemingly out of control. Conflicts over competing land uses are continuous; and this generally means conflicts between timber production and other uses.

In the midst of this confusion there seem to be several steps that can be taken to ease timber supply problems in both the short-run and long-run. And these steps are of critical importance to Montana, or any state, where timber production and processing make up a major component of the entire economy.

The timber supply challenge is interrelated with the needs that are necessary to meet other growing demands on forest resources. I do not see any quick, easy solution to either the immediate or long-run problems we are discussing here today. To cope with increasing demands on forest lands it is essential that we have a balanced program encompassing both private and public forest lands and involving all forest uses and values with an adequate knowledge base from which we can select management alternatives.

## AGRICULTURAL RESOURCES - OPTIONS PROPHETS AND PROFIT OPTIONS

by R. J. McConnen  
Department of Agricultural Economics and Economics  
Montana State University

My viewpoint is the viewpoint of most economists. What does this mean as far as Montana's agricultural resources are concerned? In simple terms and with footnotes in my voice, it means that I accept the idea that decisions about the how, when, and where to use Montana's agricultural resources are made with the expectation that the decision maker will become as well off as possible. A few qualifiers should be made. First, the criteria for well being extend far beyond the concept of a single numeraire such as dollar profits.<sup>1</sup> Second, knowledge, ignorance, and uncertainty all play important roles in the dynamic decision making process. Mother nature is both complex and variable, especially in Montana which is a great "next year country." Third, the decision maker is not a free agent. Laws, regulations, mores, and institutions all define the "rules of the game." If a new land ethic is to play a role, it will be because these "rules" are changed, not because the new land ethic will form a completely new way of making decisions. Ethics is concerned with the intentions and consequences of man's act. Rousseau held that, "...conscience is innate, a given moral

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<sup>1</sup>This viewpoint is the source of much trouble according to Lynn White Jr. in his article, "The Historical Roots of Our Ecological Crisis." Reprinted by G. DeBell ed., The Environmental Handbook Ballatine, 1970.

sense that drives men to act on values beyond their immediate gain. The empiricists ... deny the innateness of conscience and explain it as a power of discrimination acquired by experience. In the one case conscience is the originator of moral behavior, and in the other, it is the result of moralizing."<sup>2</sup> Instrumentalists such as John Dewey felt that morality lies within the individual, is relative to his experience, and is reflected as his ability to consider the consequences of his behavior and to choose intelligently between alternative courses of action. To me, a new land ethic based on an instrumentalist approach of Dewey makes sense. A new land ethic based on Rousseau's concept of innate goodness is a concept I have not trained myself to swallow.

At this point, I take my privilege as an author to make a lengthy insert at the time of editing. Because of the press for time, I was not able to develop certain ideas to the extent that I had hoped to do. A nice way of saying my thinking was fuzzy. In the process of editing, I went back to re-read Part III of Aldo Leopold's very fine book, A Sand County Almanac. I've taken the liberty of reproducing some of his remarks on a land ethic.

The case for a land ethic would appear hopeless but for the minority which is in obvious revolt against these 'modern' trends.

The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and aesthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

It of course goes without saying that economic feasibility limits the tether of what can or cannot be done for land. It always has and it always will. The fallacy the economic determinists have tied around our collective neck, and which we now need to

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<sup>2</sup> The Columbia Encyclopedia, 2nd ed., 1950, p. 636.

cast off, is the belief that economics determines all land-use. This is simply not true. An innumerable host of actions and attitudes, comprising perhaps the bulk of all relations, is determined by the land-users' tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. As a land-user thinketh, so is he.

I have purposely presented the land ethic as a product of social evolution because nothing so important as an ethic is ever 'written.' Only the most superficial student of history supposes that Moses 'wrote' the Decalogue; it evolved in the minds of a thinking community, and Moses wrote a tentative summary of it for a 'seminar.' I say tentative because evolution never stops.

The evolution of a land ethic is an intellectual as well as emotional process. Conservation is paved with good intentions which prove to be futile, or even dangerous, because they are devoid of critical understanding either of the land, or of economic land-use.<sup>3</sup>

In discussing Montana's agricultural resources, I've tried to emphasize the point that Leopold brings out so well in the last sentence of the quote just finished. Now that you know my intention - however badly exercised - the paper continues with no major changes from the manuscript presented by the author.

Philosophical baggage when packed by the novice is always bulky. However, I think you have a right and a need to know something about the philosophical option this prophet selected. For this selection will influence my perception of resource development options for Montana's agricultural resources.

What are the options for the development of Montana's agricultural resources? As a prophet, I must respond, "The future will be much like

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<sup>3</sup> Aldo Leopold, *A Sand County Almanac* (New York: Oxford University Press, 1949) pp. 224-225.

the past. Only, of course, it will be different." I'm not trying to be facetious. Any respectable prophet must use the past as a touchstone. I've always like the phrase, that goes something like, "Those who do not understand the past are doomed to repeat it." But given many of today's "new" historians, the phrase "Our Changing Past" also has appeals. We're not certain what shaped our touchstone - the past. But we have some insights. It's complicated because the forces shaping future events are changing forces. A prophet shouldn't try to "see" the future. At best he can try to understand it.

Let me restate my confusion. To talk sensibly about the options for Montana's agricultural resources. I have to go back to the basics. Unfortunately, I'm going to try to drag you with me.

"What are agricultural resources?" I'll rely on Ciriacy-Wantrup for assistance. He states, "The concept of resource presupposes that a 'planning agent' is appraising the usefulness of his environment for the purpose of obtaining a certain end. ...A resource, therefore, is a highly relative concept changing with the ends - means scheme - that is with the planning agent, his objective, with the state of technology, and with existing social institutions."<sup>4</sup>

In this framework, a resource is not a resource because it's there. Instead, a resource is a resource because it is a means to some end. With very few exceptions, agriculture is carried out as an activity within the private sector. Therefore, certain economic criteria must be satisfied before a resource is an agricultural resource. Some resources are not agricultural

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<sup>4</sup> S. V. Ciriacy-Wantrup, Resource Conservation: Economics and Policies, (University of California Press, 1952), p. 28.

resources because agriculture can't compete with other uses. An example; we harvested 12 buttercup squash from our backyard garden this year. But I don't think that the soil, air, sunlight, water and human capital and labor - provided I am reluctant to say largely by my wife and children - are agricultural resources. Agriculture is just not a competitive land use alternative from your backyard. In other cases, some resources are not agricultural resources because their use for agricultural purposes produces no net economic rent even though there may be no real competing uses. Ten or fifteen years ago, a good many grazing permits for sheep on National Forest land weren't exercised. The lands these sheep once grazed lost their right to be classified as an agricultural resource. As an aside, I wonder, how much easier did the past development make life for the present day wilderness advocates? If no economically useful synthetic fiber had ever been developed, would we have more or less wilderness today? Using Wantrup's approach, classifying resources does not require a moral judgment. In the case of agricultural resources, it does require considerable economic information.

Conclusion to date. With few exceptions, resources become agricultural resources when economic conditions favor their use to achieve some end associated with producing food or fiber. Three qualifiers: First, there are some admittedly peculiar social institutions including a National agricultural policy, the ICC, and water rights which influence these decisions. Second, changes in the relative states of technology when combined with market and political forces result in changing boundaries between agricultural and non-agricultural resources. For example, the ability to ice and ship lettuce not only led Purex - eventually - to the Salines Valley, it also eliminated



lettuce as a commercial crop in the Gallatin Canyon. Another example involves an old conservation squabble that has just begun to cool. The squabble resulted in legislative changes that declassified certain agricultural resources in our neighboring state of Wyoming. The political forces that clashed with such noise, aggressive vigor, and invectiveness spawned the ruggedly serene Grand Teton National Park.<sup>5</sup> In a different vein, it's interesting for me to reflect that the arrival of a natural gas pipeline - some 30 years ago - in my home town in eastern Montana converted coal from a resource to an "underburden". Third, expectations about the future can cause a resource to be classified as an agricultural resource. Much of the settlement in this country was an attempt to realize such expectations. A modern day Malthusian may, on the basis of his expectations, argue that our backyard is in fact and must be treated as an agricultural resource. But I disagree. I'd even disagree about your backyard.

The future? I'll define that as the next 25 to 30 years. During that time period, how about scarcity? Given the political and social institutions that exist in the western world, there'll only be enough scarcity to give value to food and fiber. But scarcity in the sense of famine will not exist. Particularly not in the U. S. The Russian grain deal has not changed the long run situation. The simple fact is, the U. S. can still produce more food and fiber than it can either consume or market abroad. I don't see any change in this situation - not even after 2000. Along with many other problems, the U. S. Congress must decide once again this next year how it will allocate part of the right to produce the required food and fiber in this country.

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<sup>5</sup> David Saylor, Jackson Hole Wyoming: In the Shadows of the Tetons, (University of Oklahoma Press, 1970).

The allocation is necessary because - at the present price levels - farmers and ranchers want to produce more of certain goods than we can normally expect to consume at home and market abroad. A not independent market system will decide how much - where - and how - the rest of the food and fiber will be produced. How much will Montana produce? How will it be produced? What resources will be required? In and by themselves, maps giving soil types, vegetative cover, precipitation, and length of growing season are not enough. To be used for agriculture, some combination of physical, biological, human, and capital resources must be able to a) be a successful competitor in an economic sense on the behalf of agriculture against other land uses and b) generate or give reason to hope for the generation of a positive economic rent. At the present time, significant amounts of land in areas around Billings, Bozeman, and Missoula, and in the Bitterroot and Flathead are being used for agriculture, but agricultural use is probably a holding action. In many other areas of Montana, land is being either held or purchased primarily as a consumer good and not primarily as an input in the process of agricultural production. At the present times, however, these lands may still be used for agriculture. Aside from these two cases, what determines if an area of land and the associated resources will be used for agriculture in Montana? I think there are five major inter-related elements. All I'll do is provide a rough outline. I'll only point out those items that I believe are subject to manipulation by public policy. The five elements are; (1) national agricultural policy, (2) agricultural competition from other regions, (3) competition within Montana from alternative uses for land and water, (4) the revenue and costs associated with various agricultural alternatives

for Montana, and (5) the changing ecological constraints and the perception of agricultural damages.

No single item will be more important than our national agricultural policy. In 1973, we'll have new agricultural legislation and John Melcher has a near impossible job of looking after the interests of Montana. The last agricultural legislation barely passed the House. The temporarily high international prices for grain, the questions aroused by the Russian grain deal, and the decreasing identification of the general American public with agriculture hardly creates the ideal political environment for Montana's agriculture. The current catchy phrase is, "Who will control agriculture?" The present structure of American agriculture is changing. By this time next year, we could see significant changes in the answers to the question, "Who will control agriculture?" As a prophet, I'd like to wait until I see the 1973 agriculture legislation.

Closely tied in with national agricultural policy is the competition from other agricultural regions. Montana's vegetable and fruit industry is virtually extinct. We've accepted that. Competition from other regions will largely be felt because of their impact on prices at terminal markets. It seems obvious, but given U. S. surplus production capacity at the current price levels, it is not imperative that all of Montana's resources that have a biological capability of producing food and fiber need be used to do so. To the degree permitted by national agricultural policy, Montana must earn anew each year the right to produce and market its share of the nation's food and fiber.

Remember the coal I mentioned that became an "underburden" near my old home town? I realize that when it comes to coal, there's more discussion

about overburden today. A question I've asked myself, but haven't tried to find the answer, is "What will be the impact on grazing and crop production of alternative levels of coal development?" Perhaps of more significance, what will be the consequence on water availability in the Yellowstone? The worst I hear is terrifying. With careful planning, the best is probably liveable. But perhaps a more serious competitor for agricultural land - and water - is the consumptive use that I mentioned earlier. I am concerned about this phenomenon. Not because "badly needed" agricultural land is being gobbled up. By my definition, if agriculture cannot compete, the resources involved aren't agricultural resources. I'm concerned for two other reasons. The first reason is because of a fragmented ownership pattern that means ugly and expensive land use for today and for many tomorrows. I'm not concerned that "good agricultural land" is going out of production south of Bozeman. I am concerned about lack of central sewerage treatment, poorly designed and badly built road systems, expensive school bus routes, and a spreading out but without much public space. Secondly, and perhaps of greater importance is a concern for the impact on the general human community that might be caused by the conversion of agricultural lands into speculative tracts and seasonal second homes. What will be the impact on income distribution, availability of services, and life style for the people who live in Montana all year long?

What will be the revenues and costs for operational agricultural alternatives for Montana? Revenues equal local price time quantity. Local prices are going to be terminal prices reduced by transportation and marketing costs. Transportation is expensive to Montanans. For example, nearly a

third of the terminal price of wheat goes to pay the freight bill. Not the costs. The costs are less than the shipping rates. Agricultural process firms have tended to move out of Montana. Our one good hope for expansion is probably a slaughter industry based on our rapidly expanding feeding industry. Some special cases have special problems. Closure of sugar refineries have had a serious impact on some regions in Montana in the past. In a short time, the newly formed Great Western Producers Cooperative will probably own Great Western Sugar. I had some doubts about this. Now it's a reality. It's important for all Montana that the Great Western Producers Cooperative succeed. I think it's the responsibility of all Montanans to help it succeed. Particularly public agencies. And most particularly those public servants who were doubting Thomases. I know one such person fairly well.

The other side to revenue is quantity. I've already said that the nation may have no urgent need to produce more. But not so for the state of Montana. Improving yields of both crops and livestock may be one of the best insurance policies Montana can buy in order to maintain its competitive strength relative to other regions of the U. S.

How about costs? Much can be said, but I'll restrict myself to a few comments about capital for Montana agriculture. Families get smaller, but even the family farms get bigger. And they require more capital per unit of output. Montana agriculture, like much of U. S. agriculture faces serious capital problems. Capital is always available if you're willing to pay the price. Without new ways of controlling resources, that price may be too high for present day Montana agriculture.

Farmers and ranchers have discovered in the past few years that the best managers among them have been applied environmentalists all along. Unfortunately, however, much of agriculture seems to have taken a defensive stand against much of the new environmental concern. In my mind, this is unfortunate. Despite some cases of environmental paranoia, this new environmental concern is by and large both healthy and necessary. The goal for agriculture should be, in my mind, in the form of constructive participation. For example, not all stream sediment derives from agriculture. The geological process is still in process. But agriculture is not blameless. For at least the last forty years, good farmers and ranchers fought to keep the soil in place. Good agriculturalists should be a portion of, not opposed to, the best part of the environmental movement. Unthinking opposition means a decrease in Montana's agricultural resource base. Constructive cooperation means a future with less conflict, better economic health and a greater social contribution.

The options for Montana's resources with agricultural potential will be determined by our relative competitive ability to satisfy the food and fiber needs of the nation and the world. I use the term competitive ability in the broadest sense. Therefore, our competitive ability will not only be determined by market forces. Legislative action and related social concern that run the gamut from national agricultural policy to environmental pressures including concern about land use will also temper our ability to compete. Our ability to compete will depend on our ability to mutually accommodate - to quote Ted Schwinden from a speech of several weeks ago - "the aspirations of the people of Montana to the demands made by our nation".

## METAL RESOURCE

by Montis R. Klepper  
Assistant Director, Geological Survey  
Washington, D. C.

I welcome this opportunity to return to the state I consider my second home to participate in this seminar on Natural Resource Development Options. During the past 25 years, I have had the good fortune to devote a substantial part of my time to geologic studies in the western part of the state and have developed a profound appreciation of its bountiful natural resources. Its vast acreages of agricultural and grazing lands and forests, its streams and lakes, its diverse mineral wealth, its wildlife, scenic values, and outdoor recreational opportunities immediately comes to mind. Pressures on such resources are inexorably increasing, partly due to increasing population, but in large measure due to our society's requirements for energy, mineral products, forest products, farm and ranch products, and recreational experiences. At the same time increasing public concern over the alteration and degradation of the environment due to human activities is pressing for Federal and State legislation aimed at assuring an acceptable environment. Such legislation is likely to impose severe restraints on development of our natural resources, and accordingly, should be drafted in the light of the best data available.

It is timely, therefore, for this group to convene to consider Montana's resource potential and options, and the value judgments and the tradeoffs we as citizens are willing to make to assure the type of society or quality of

life we want with minimum or acceptable impact on our natural environment--our air, water, and land. If we desire an improved quality of life or standard of living for all--including comfortable housing, adequate transportation and communication, ample nutritious food, and the wide range of manufactured products and services to which we are accustomed, we must rely to a considerable extent on developing our own natural resources. Experience dictates that heavy reliance of foreign sources is undependable, costly, and generally unwise. I happen to be an optimist in believing that within reason we can expand the development of our natural resources in orderly and thoughtful fashion without serious impact on our environment.

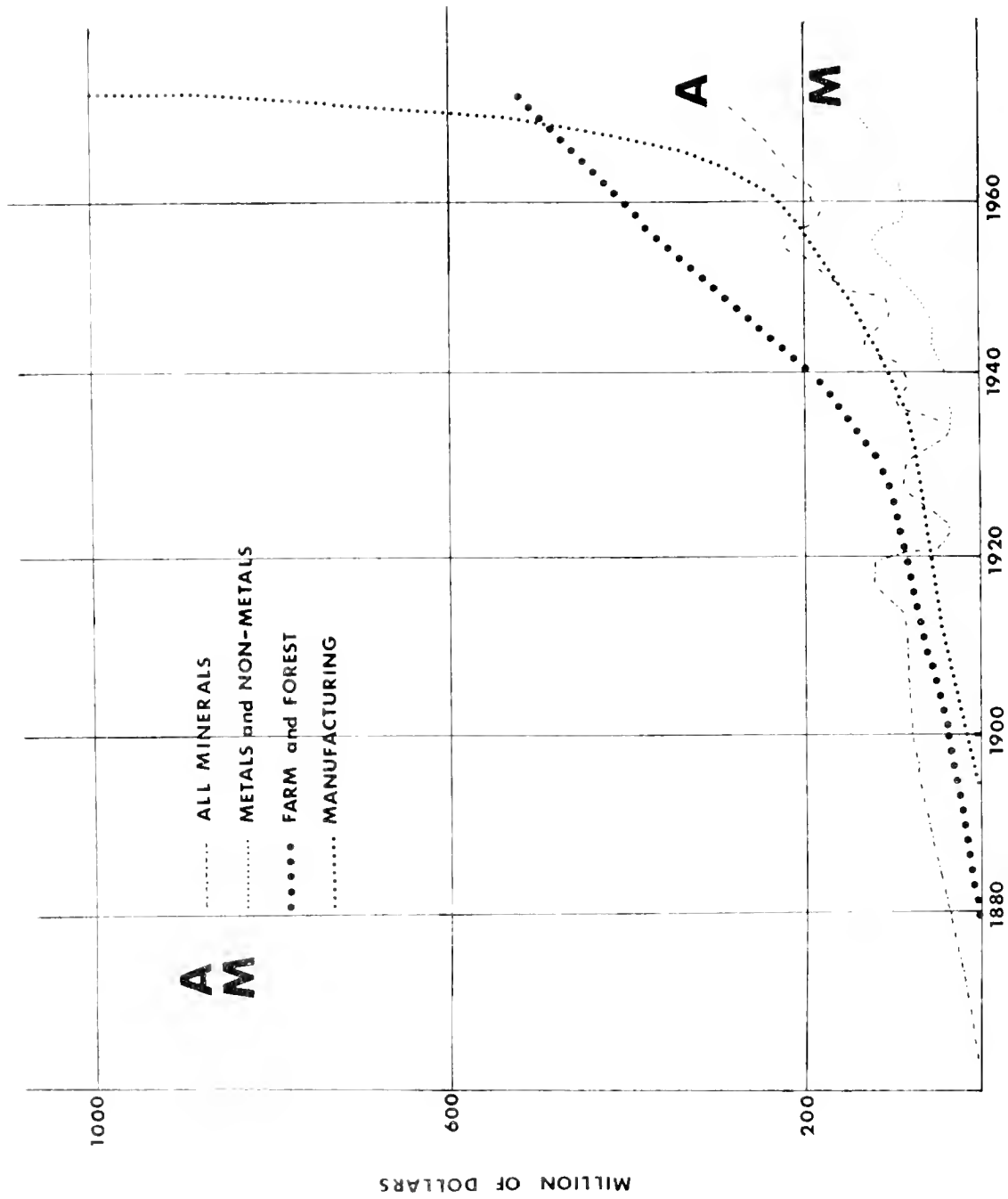
Enough for the general and philosophical. What is the problem we face with respect to minerals? V.E. McKelvey, Director of the USGS, summarized it in a recent address at the dedication of the William B. Heroy Geological Laboratory at Syracuse University. He pointed out that even if we achieve population equilibrium, 60 or 70 million people will be added to our population by the year 2000. To provide for these new people, to raise the standard of living of the disadvantaged, and to replace facilities that are worn out, we will need as much or more in the way of mineral resources as we have used in all our previous history. Even if we were to attain zero economic growth, our presently large resource requirements would continue in order to maintain the economy at a steady-state level. Bureau of Mines specialists predict (Mineral Facts and Problems, Bulletin 650), for example, that by the year 2000, domestic demand for primary copper will be at least triple that of 1968 and perhaps as much as five-fold; for aluminum at least five-fold, for nickel at least three-fold, and for iron at least two-fold. Equally significant is the fact that large deposits of valuable minerals are rare geologic phenomena and



that we have no control over where they occur. If we are to benefit from them, we must exploit them where they are. Indeed, our ingenuity is taxed in solving nature's riddles and in developing techniques for finding new hidden deposits, for most of those that were exposed at the earth's surface have already been found. These are but a few examples, but I think that they clearly indicate the problems we face unless we are willing to substantially change our way of life.

Now, where does Montana fit into this picture? I'm sure that you are all aware of Montana's major role as a metal producer. Indeed, it has been called the Treasure State and Butte is widely known as "the richest hill on earth"--and rightly so. The Anaconda Company reports that from 1880 through 1971, the Butte hill yielded more than 9 million tons of copper, 2.45 million tons of zinc, 1.8 million tons of manganese, 0.4 million tons of lead, 675 million ounces of silver and 2.7 million ounces of gold.

To provide a perspective of the role of minerals in Montana's economy I have summarized some key information from Minerals Yearbooks and Statistical Abstracts on two graphs. The first (Figure 1) compares the value of mineral products, agricultural and forest products, and manufactured products over the past century. Note the up to about 1920, Montana's economy was essentially a mineral economy--the value of mineral products significantly outranked that of farm, forest, or manufactured products; from 1920 to about 1960, minerals and manufacturing ran neck and neck, with agriculture out in front and pulling ahead; since 1960, both manufactured and farm-forest products have outstripped mine products, and during the past several years the value of manufactured products has increased sharply. During the past 10 years metallic and non-metallic products have accounted for 10-20% of Montana's "GSP," and the great



## MINERAL AND OTHER PRODUCTION

Figure 1

deposit at Butte for about two-thirds of that. Thus, though mineral products are no longer preeminent, they are still an important factor--even more important than the raw data indicate for some are processed further and value is added to them within the State.

On the second graph (Figure 2a followed by 2b) are plotted production data for the four metals that accounted for the bulk of Montana's mineral output. Note the highly cyclical nature of production and the declining role of gold and silver since the early 40's and of zinc in recent years. Note also that the cumulative value of the four metals has been almost \$5 billion (in nonadjusted dollars); at recent metal prices the value of the copper output alone would be over \$6 billion! Note also that value of production of all other metallic and non-metallic mineral commodities has gradually increased from about a million dollars a year in 1920 to \$50 million in 1970.

In summary, Montana's economy has evolved over the past 50 years from strongly mineral dependent to one much more broadly based. Nevertheless, the value of mineral commodities produced has gradually increased over the years and since the mid-thirties largely reflects increasing output of oil and gas and non-metallic minerals. Nor should we overlook the fact that in-state processing of Montana minerals and use of indigenous energy resources contributes substantially to the GSP.

Now, what of the future? The graphs may suggest that Montana's resources of metallic minerals have been largely exhausted. Though geologic forecasting based on limited data is risky, I am confident that Montana's mineral resources are large and varied, that they have not been largely exhausted, and that the potential for future production is great.

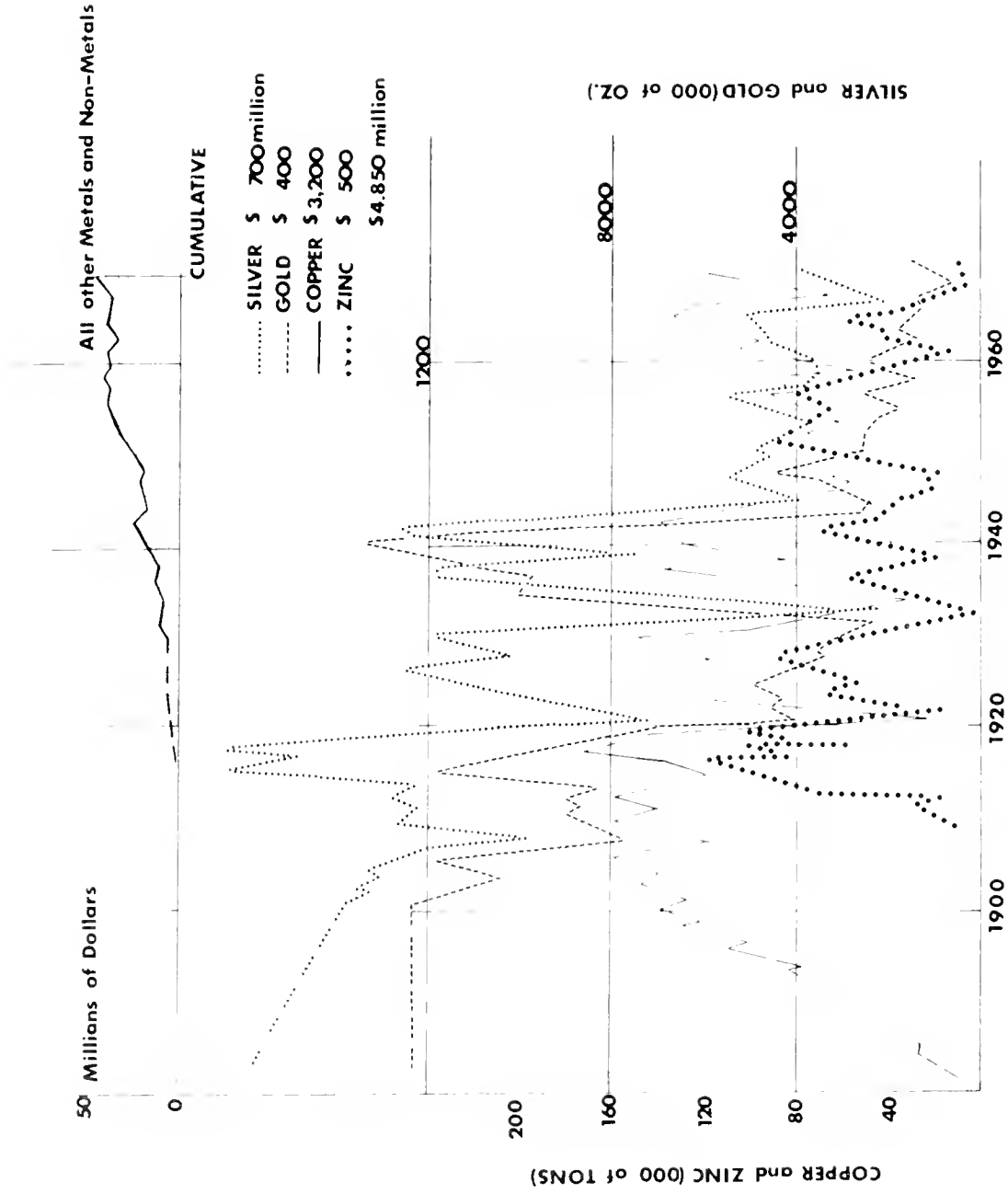


Figure 2a

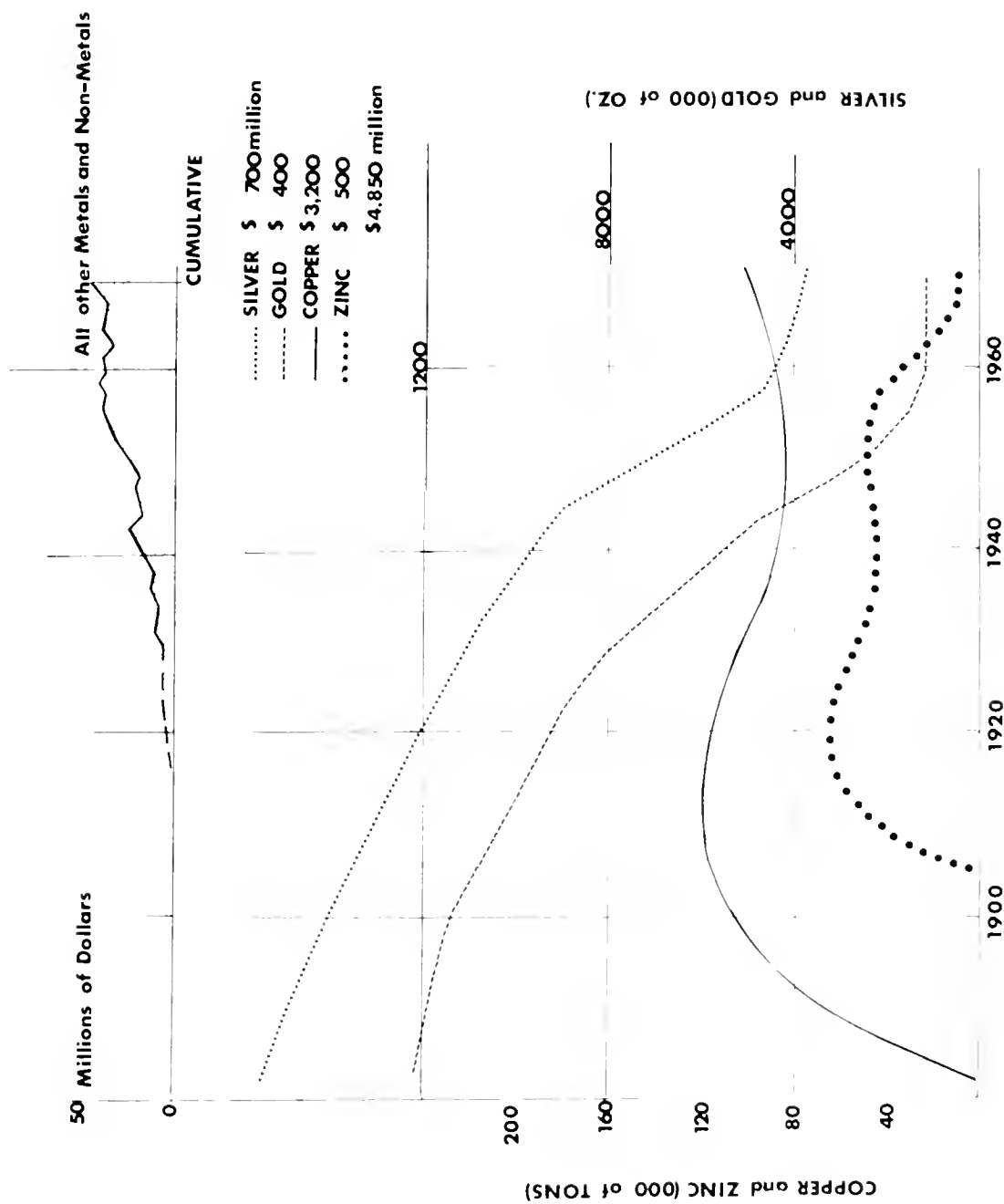


Figure 2 b

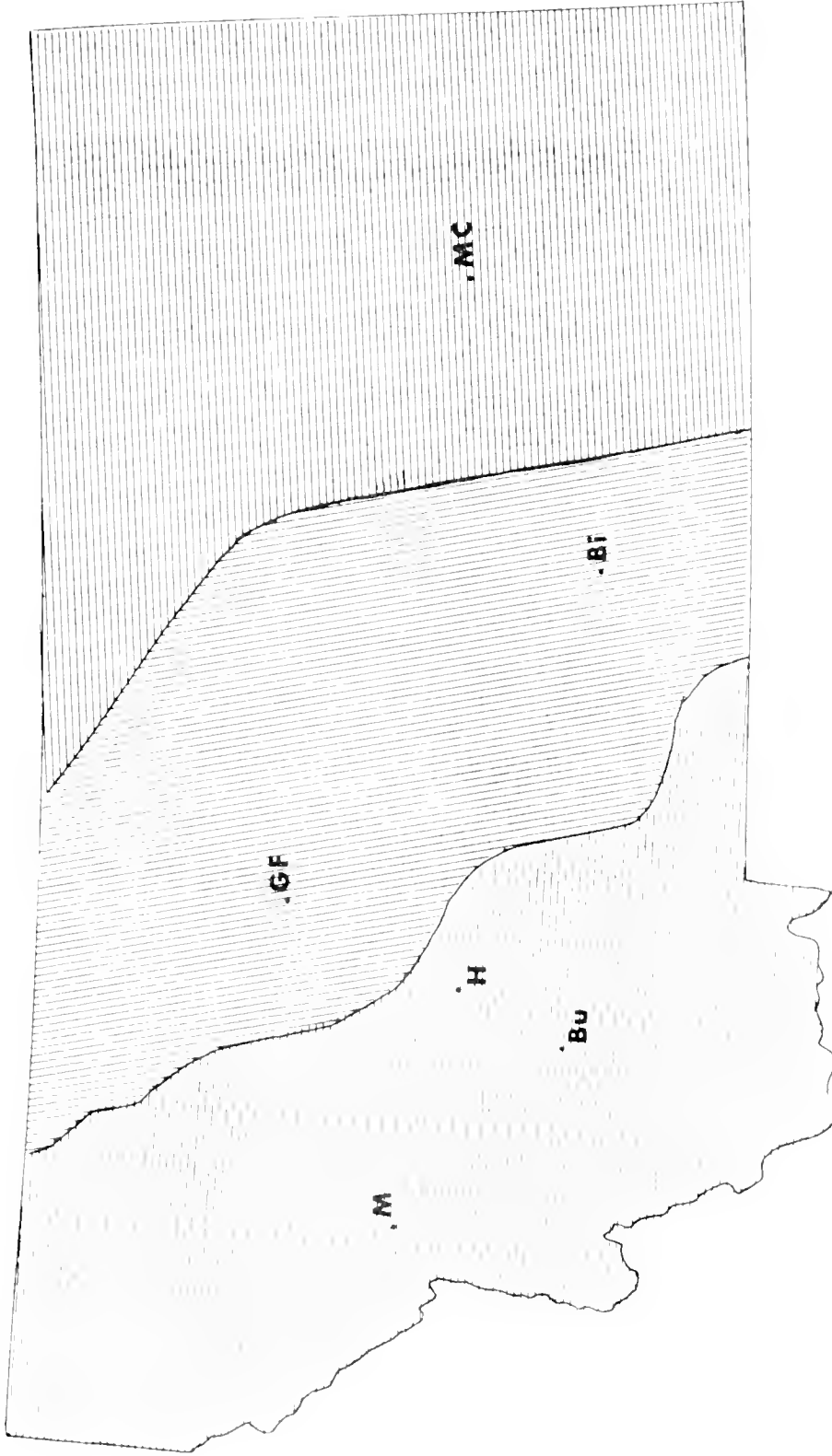
Montana may conveniently be divided into three geologic provinces, each with different mineral potential (Figure 3). The eastern third of the State consists of relatively young and only slightly deformed sedimentary rocks. It contains the bulk of Montana's vast resource of coal and major oil and gas resources as well. The western third of the State comprises strongly folded and faulted sedimentary and metamorphic rocks of diverse age cut by many bodies of intrusive igneous rock; this geologic domain has yielded most of Montana's metallic mineral production and holds great promise for new discoveries; it also contains diverse non-metallic mineral resources. The central third is transitional in geologic style and has more potential for energy and non-metallic mineral resources than for metallic deposits. The distribution of known deposits of coal and of selected metallic and non-metallic resources and the difference from province to province are illustrated by these two very generalized maps (Figures 4 and 5).

Let us now consider briefly the resource potential of some mineral commodities that I consider to be most significant in Montana.

#### COPPER AND ASSOCIATED ELEMENTS:

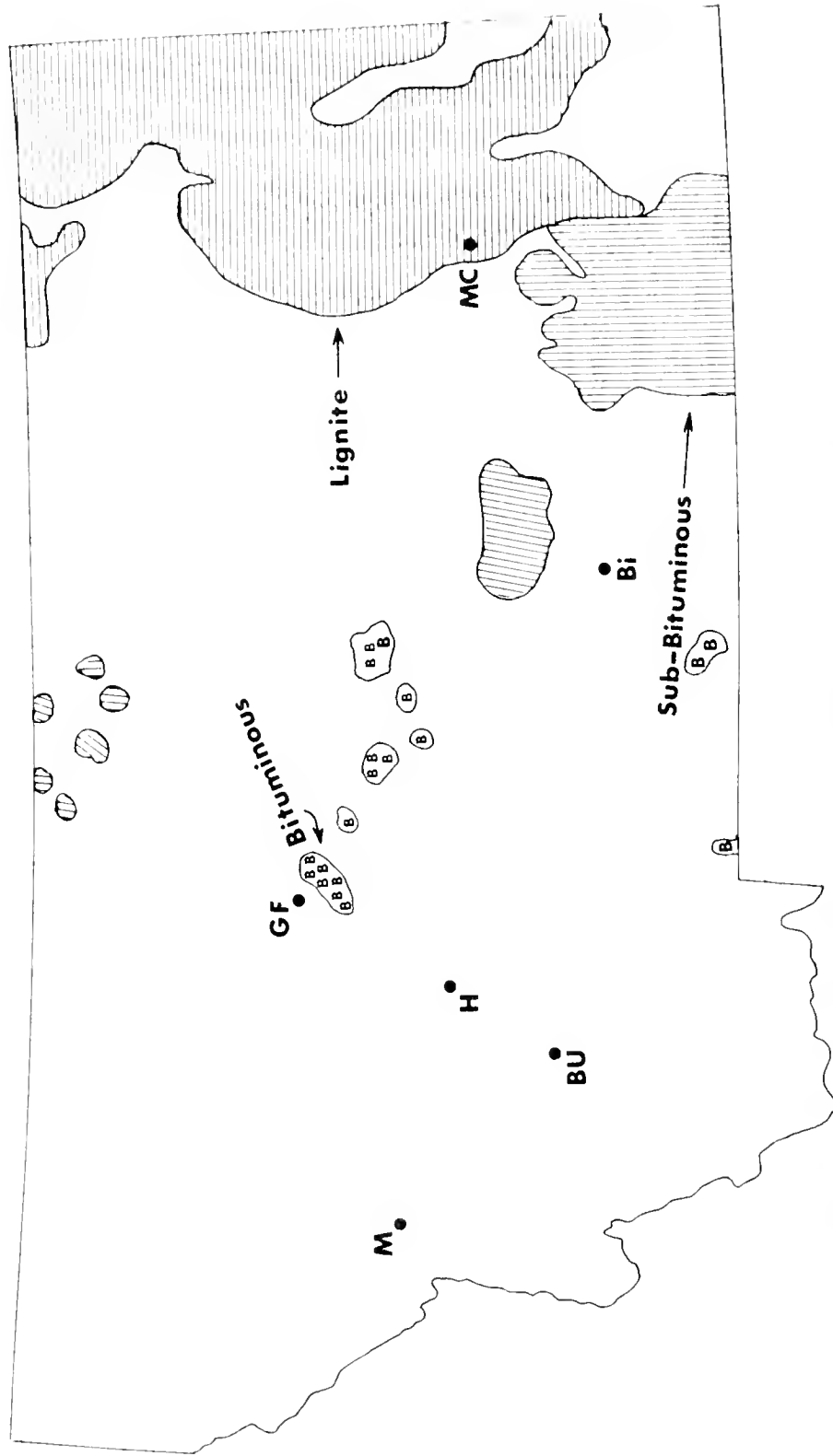
Copper is a gregarious metal, typically associated with other metals. Three types of deposits in which copper is the principal metal are known in Montana:

1. Polymetallic veins and stockworks associated with late Cretaceous or Tertiary granite intrusives; 2. disseminations or segregations in older Precambrian stratified mafic intrusive rocks; and 3. disseminations in late Precambrian sedimentary rocks.



## GEOLOGIC PROVINCES

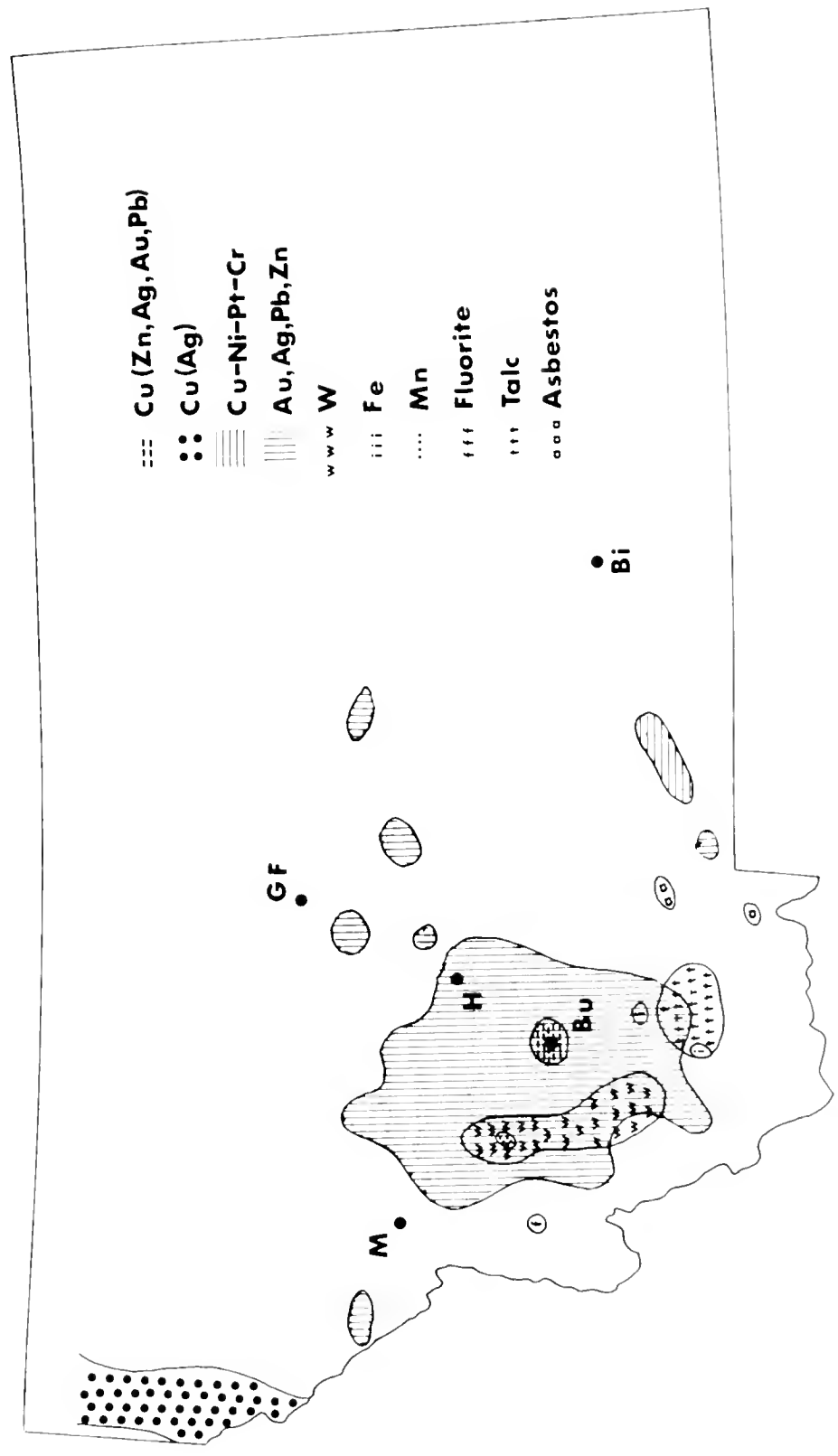
Figure 3



# PRINCIPAL COAL - BEARING AREAS

Figure 4





**SELECTED MONTANA MINERAL DEPOSITS**

Figure 5

1. The great deposit at Butte is a classic example of the polymetallic type in which copper predominates but gold, silver, lead, zinc, and manganese add considerably to the value of the ore. Polymetallic veins elsewhere in western Montana, valuable mainly for silver, gold, lead, or zinc have been important in the past; nevertheless, the aggregate production from all other districts has been less than a tenth that of the great Butte deposit.

A great resource of copper and associated metals in this type of ore remains at Butte, probably as much as has been mined to date. Some is high-grade ore at great depth and therefore, costly to mine. The greater part, however, is low-grade ore closer to the surface and amenable to large-scale, low-cost operations.

A large low-grade deposit of copper with associated molybdenum near Lincoln has been delineated in recent years by the Anaconda Company. Other moderate-sized deposits of the polymetallic type are likely to occur beneath young volcanic rocks and at greater depth elsewhere in and around the Boulder batholith; but advanced geologic concepts and exploration techniques may be required to discover them.

2. Copper, nickel, chromite, and platinum metals occur in the Stillwater Complex, one of the world's few large deposits of this type. In 1971 the Anaconda Company reported reserves indicated by a \$4 million exploration program of 150 million tons grading 0.25% copper and 0.25% nickel (E&MJ, Oct. 1971, p.77). Significant quantities of platinum are also present. Other companies that have explored in the Complex have not announced their findings. The Complex is more than 15 miles long. Because of its geologic nature, a resource potential much greater than the reserves discovered to date can confidently be inferred.

regional steel industry. A large low-grade molybdenum deposit near Neihard, molybdenum associated with copper is the deposit near Lincoln, and several smaller deposits elsewhere indicate the possibility of a significant molybdenum resource. Similarly, tungsten is widely present and has been mined locally around the Boulder batholith. A major resource of thorium and rare earth metals seems likely along the Montana-Idaho border in the Lemhi Pass area.

Montana's non-metallic mineral resources are varied and widespread. Time permits only brief mention. Stone, sand and gravel are ample in most parts of the State. Phosphate rock has been mined near Garrison and Melrose; a significant resource remains there and elsewhere in western Montana, but the geology of the deposits is complex and most deposits are uneconomic at present. Production and reserves of talc, vermiculite, fluorspar, gypsum, barite, and cement rock, though not major factors on a national scale, are significant components of Montana's varied non-metallic mineral industry. Asbestos and graphite, both of good quality but in low concentrations, have been explored but production has been small and the resource potential is modest.

No review of Montana's mineral resources would be complete without mention of the vast coal resources. Suffice it to say that Montana ranks second in the Nation in coal reserves: 220 billion tons, of which the greater part is sub-bituminous. Much of the coal is in thick beds with a low sulfur content and is amenable to surface mining. Montana also is a moderate producer of oil and gas and resources are likely to be sufficient to sustain production at about the present rate for many years.

The Stillwater Complex also contains by far the largest resource of chromite in the U.S. Though the deposits are non-commercial at present, more than 1 million tons of chromite concentrate were produced during and after World War II. Reserves were estimated at 2.5 million tons of  $\text{Cr}_2\text{O}_3$  in 1962; the total resource is undoubtedly much greater. Significant quantities of platinum are associated with some of the chromite.

The Complex also contains vast tonnages of anorthosite, a potential ore of aluminum.

The Stillwater Complex may surpass the Butte Hill as a Mineral Treasure House!

3. In recent years a hitherto unknown type of copper deposit has been recognized and explored in northwestern Montana. Copper with small amounts of silver is widely disseminated in thin zones within a thick sequence of late Precambrian sedimentary rock that underlie many square miles of northwestern Montana. Exploration has been active and one deposit has been developed. Deposits are generally low-grade but some may contain as much as 1% copper and 2'oz. silver. Though known deposits of this type appear to be sub-economic at present, the potential is large.

In summary, reserves and inferred resources of copper and related elements, notably zinc, nickel, chromite, and silver are ample to sustain Montana as a major metal producing state for many years.

Several other metals deserve brief mention. Low-grade iron deposits containing 50 million to 250 million tons of ore suitable for beneficiation and pelletizing are known near Dillon and beneath the Stillwater Complex. Though small by world standards, they are probably suitable to support a

To supplement my rather general and somewhat speculative State-wide forecasts, I include below more specific reserve and resource information on several areas. This information was provided by the Anaconda Company in response to my request for resource information and is included verbatim with their permission.

"The State of Montana has produced many hundreds of millions of dollars worth of strategic metals over the past 100 or so years. It also contains at the present time several known but undeveloped mineral reserves of definite importance to the U.S. in the decades to come. It is also certain that many more as yet unknown mineral deposits and future mines will be found. There is much prospecting yet to be done.

The Anaconda Company was born in Montana and has continuously operated in the State. The Butte District has been the site of its more intensive operations and despite three-quarters of a century of activity there is probably more metal left in the Butte hill than has been removed. Current reserves held by the Anaconda Company in the Butte District include more than 10 million tons of +4% copper in the veins of the underground mines and more than 400 million tons of approximately 0.7% copper in the Berkeley Pit and adjacent area. In addition, there are substantial tonnages of copper-bearing material of comparable grade that may ultimately provide the basis of additional open pit operations and possibly large scale underground operations. Although copper is the principal metal in the Butte District, substantial tonnages of zinc, manganese and silver have been produced in the past and still remain.

The Anaconda Company has actively explored in Montana and during the past 10 years or so has developed significant reserves at two other major properties. In the Stillwater region it has located what may prove to be the largest body of sulfide nickel in the United States. Drilling to date indicates a minimum of 150 million tons of material containing 0.25% nickel and 0.25% copper. The Stillwater property also contains platinum and chrome, and although the chrome is too low grade for present economics, it is strategically important as possibly the largest reserve of this metal in the Western Hemisphere.

In the Lincoln area, Anaconda has developed a copper-molybdenum ore body which could be amenable to open pit mining. This deposit is in excess of 100 million tons of 0.5% copper. Anaconda also holds valuable silver properties in the Flathead District, and other base metal properties in the Corbin Wickes and Neihart regions.

Because of Montana's proven ability to provide a vast outflow of vital minerals for the benefit of our country and because of her tremendous untapped resources, the Anaconda Company has staked its future with that of this great State."

We can have confidence that Montana's mineral resource potential is great. The benefit from this great potential that accrues to the State and the Nation will depend upon decisions made with respect to natural resource options. Opting for unduly restrictive legislation and regulations will suppress exploration, development, and production and leave much of this potential mineral wealth buried in the ground. Alternatively, offering incentives for prudent exploration, development, and production that is mindful of environmental quality will promote new discoveries and assure a vigorous industry contributing substantially to Montana's economy and the Nation's needs. Maximum benefit to the State's economy would accrue by fostering increased processing of raw mineral products within the State.

The options are clear. Modern technology can meet the challenge of discovering new deposits and developing environmentally acceptable extractive systems. Value judgments and trade offs remain to be made.

## ENERGY RESOURCES

by Vincent M. Brown  
Executive Director  
National Petroleum Council  
Washington, D.C.

It is essential that groups such as this meet in public forums to understand and discuss our national resources. An awareness of the Nation's potential and the problems we face in this area is vital, if sound policies are to be formulated which will ensure the wise use and orderly development of our resource potential.

My assignment is to give you an overview of our present national energy posture, and to define for you the outlook for energy in the U.S. as the National Petroleum Council sees it.

This is no small assignment, particularly when you consider the intricate part that energy plays in the lives of all of us. Energy not only provides the critical materials necessary to supply the Nation's vast defense, industrial, transportation and communications systems, but provides heat, light, air conditioning and many everyday comforts--thus affording the United States the opportunity to enjoy one of the highest standards of living in the world. If these levels of activity are to continue, the availability of cheap and abundant energy resources can no longer be taken for granted.

As our energy requirements double over the next 15 years, it is essential that the fulfillment of such needs be achieved in harmony with the Nation's goals. It should be recognized, however, that even though goals may change, the need for energy to attain new goals will still be present.

As an industry advisory body to the Secretary of the Interior, the National Petroleum Council has been conducting a study on the U.S. energy outlook for the past three years.

Although the final results of this study will not be available until December, I would like to discuss with you some of the findings that were contained in our Initial Appraisal issued last year. By briefly going through these findings, you might get a better understanding of the tremendous requirements related to energy that we face as a nation.

The request to do this study came from the Department of the Interior, as all of our study requests do. Recognizing the pervasive, far-reaching changes taking place on the U.S. energy scene and the potential implications involved, Assistant Secretary Hollis M. Dole called for a comprehensive study of the U.S. Energy Outlook from now to the end of the century. (Figure 1). Implicit in the request were three fundamental questions: How much energy is the United States going to need? Where are we going to get it? What changes in government policies and/or economic conditions in the energy industries would serve to enhance our national energy posture?

To handle this assignment, the NPC Committee on the U.S. Energy Outlook was established and organized as shown on Figure 1. It represents all of the energy industries and includes, I believe, some of the best talent on these matters available in the United States today. We have representatives not



# **Assignment**

## **COMPREHENSIVE STUDY OF THE U. S. ENERGY OUTLOOK FROM NOW TO END OF CENTURY.**

- HOW MUCH ENERGY DO WE NEED ?
- WHERE ARE WE GOING TO GET IT ?
- WHAT CHANGES IN GOVERNMENT POLICIES OR ECONOMIC  
CONDITIONS WOULD ENHANCE NATIONAL ENERGY POSTURE ?

FIGURE 1

NATIONAL PETROLEUM COUNCIL  
COMMITTEE ON U.S. ENERGY OUTLOOK  
ORGANIZATION CHART

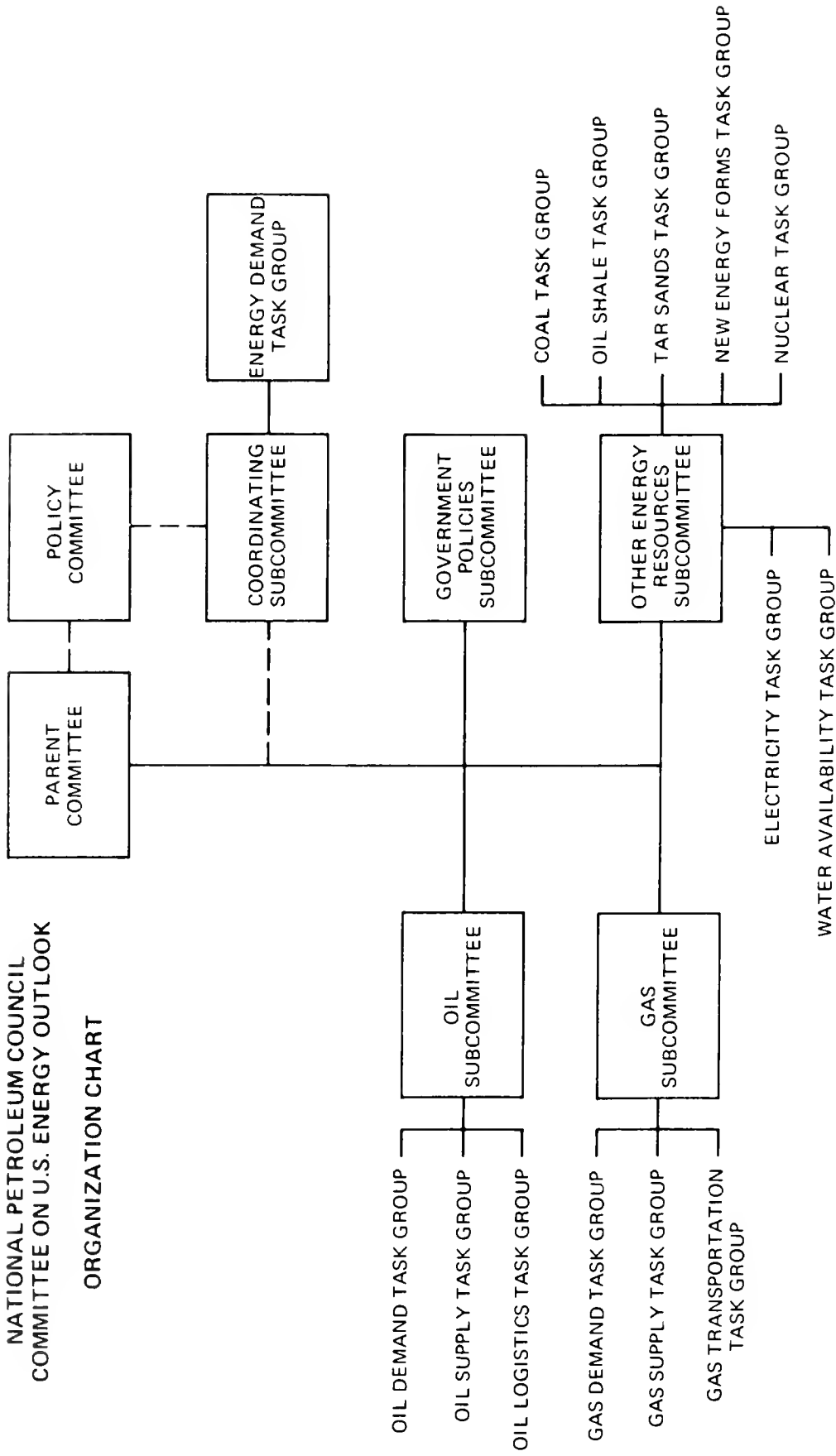


FIGURE 2

only from the oil and gas industries, but from the coal, nuclear, and electric industries and a financial community as well.

The study program of the Committee involves two distinct stages (Figure 3). The projections which I will discuss with you today come from our "initial appraisal"--a projection of the U.S. energy demand/supply balance in the period 1971-1985, assuming no major changes in government policies or economic conditions in the energy industries. It shows us what might happen if we continue unwittingly along the path we are now on. The results, particularly toward the end of the period, as we shall see in a few moments, are not attractive. This stage was completed in July 1971.

Stage II, which is now in progress and nearly completed, seeks to identify and evaluate the various changes in government policies and economic conditions in the various energy industries which could contribute to an improved national energy posture. It defines for the Secretary of the Interior selected energy policy options and evaluates the consequences of each. The report also casts up a series of new U.S. energy demand/supply balances for the year 1985, assuming that reasonable selections from these options are adopted.

The final report also looks beyond the year 1985 to the end of the century and tries to develop some reasonable approximations of probable trends in energy demand and supply. In particular, sets of parameters have been developed which will give reasonable assurance that the Nation will have adequate, secure energy resources to meet its requirements at the turn of the century. A National Energy Policy, based on our findings, will also be suggested.

The initial appraisal was made under the fundamental assumption (Figure 4), as mentioned a moment ago, that current government policies and regulations and

# **Study Program**

## **STAGE I - 1971 to 1985 (Completion: 7/71)**

AN "INITIAL APPRAISAL" OF DEMAND-SUPPLY SITUATION  
BASED ON STATUS QUO ASSUMPTIONS.

## **STAGE II - 1971 to 1985 (Completion: 7/72)**

- IDENTIFICATION AND EVALUATION OF CHANGES  
WHICH WOULD IMPROVE NATIONAL ENERGY POSTURE.
- REVISED ENERGY DEMAND-SUPPLY BALANCE  
REFLECTING SUCH CHANGES.

## **STAGE III - 1985 to 2000 (Completion: 12/72)**

OUTLINE OF PROGRAM FOR MEETING ENERGY  
REQUIREMENTS IN YEAR 2000.

FIGURE 3

## **Assumptions for Initial Appraisal**

### **BASIC:**

CURRENT GOVERNMENT POLICIES AND REGULATIONS  
AND PRESENT ECONOMIC CONDITIONS IN THE ENERGY  
INDUSTRIES WOULD CONTINUE WITHOUT MAJOR CHANGES  
THROUGHOUT THE 1971—1985 PERIOD.

FIGURE 4

present economic conditions in the energy industries would continue without major change throughout the 1971-1985 period. In particular, it was assumed that oil import controls, natural gas price regulations, leasing of federal lands, environmental controls, tax rates, and research would continue on essentially the same basis as at present. There are other more detailed assumptions made which I will not go into at this time but which are fully documented in the report.

The Initial Appraisal figures which I am about to show you are not a forecast of what is likely to happen, and should not be so interpreted. These projections reflect an optimistic view of what might happen without major changes in government policies and economic parameters. They have been used by the U.S. Energy Outlook Committee as benchmarks in evaluating the consequence of possible change and as a means of defining problems and areas where corrective actions are needed.

I would now like to summarize the findings of this Initial Appraisal because, (Figure 5) while they may be considered optimistic, they will give you a basic indication of the magnitude of our requirements.

An assessment was made of the probable growth of the U.S. economy and how that would affect U.S. energy consumption (Figure 6). From this it was determined that the total energy consumption of the United States will nearly double during the 1971-1985 period.

The overall growth rate in U.S. energy consumption is expected to average 4.2 percent per year from 1970 to 1985. Electricity demand grows the fastest at 6.7 percent per year; nonenergy next at 5.4 percent; transportation at 3.7 percent; residential and commercial at 2.5 percent; and industrial at 2.2

# **FINDINGS OF THE INITIAL APPRAISAL**

# U. S. Energy Consumption: Initial Appraisal (Quadrillion BTU's)

125

NON-ENERGY	NON-ENERGY
RESID.— COMM'L	RESID.— COMM'L
TRANSPORT.	TRANSPORT.
INDUSTRIAL	INDUSTRIAL
ELECTRICITY	ELECTRICITY

4.2

5.4

2.5

3.7

2.2

6.7

68

NON-ENERGY
RESID.— COMM'L
TRANSPORT.
INDUSTRIAL
ELECTRICITY

1970

Average Annual % Increase

1985

FIGURE 6



percent. We show electricity as a sector, because electric power plants consume fuels. If we converted this to strictly energy consumption, most of the sector labeled "electricity" would fall in the residential-commercial and industrial sectors.

Our subcommittees for oil, gas and other energy resources made independent assessments of the individual fuels involved. They applied their respective judgements in deciding what factors would affect demand for the fuels examined and took into account the probable supply of these and other fuels. From these projections, an energy supply and demand balance (Figure 7) was developed. The supplies of the various fuels required to make this balance are shown here. While there are numbers assigned to these charts, the visual impact may have more meaning for you.

Looking at the 1985 bar, you will note the addition of two synthetic fuels that are not shown in the 1970 balance, syncrude and syngas. They provide very small quantities, however. The large increase in demand is covered primarily by growth in the oil imports, gas imports, U.S. coal and U.S. nuclear. The assessments of the various supply task forces were within two percent of estimated energy requirements in the years 1970, 1980 and 1985. The Coordinating Subcommittee covered this small shortfall in supplies by projecting an increase in U.S. coal production and oil imports... the two fuels that were thought to have significant flexibility in supply.

The trends in the individual fuels cannot be seen readily on this figure, so let's look at some of the separate components of this overall supply picture.

Quad.  
BTU

# U.S. ENERGY BALANCE: INITIAL APPRAISAL

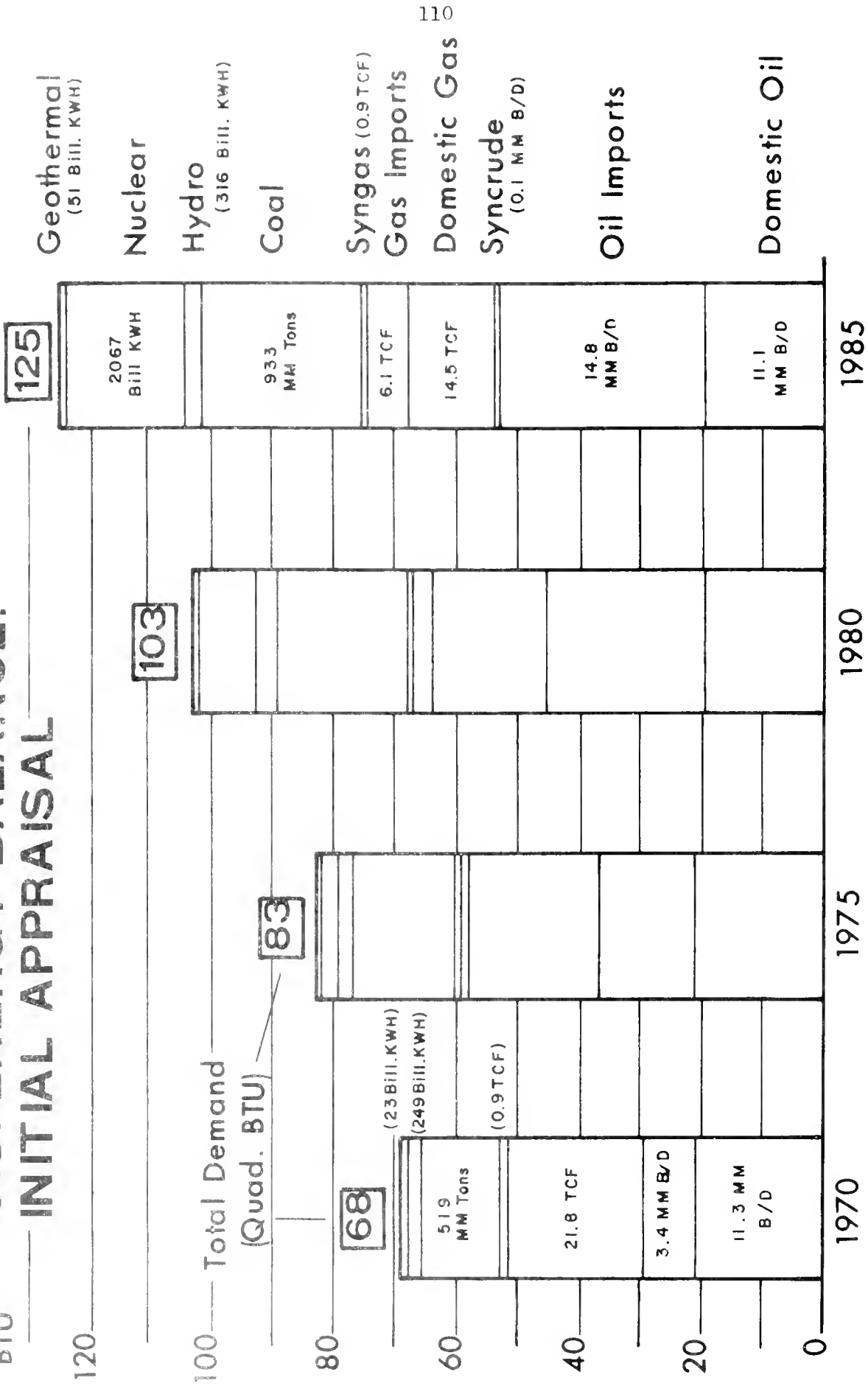


FIGURE 7

This chart shows our fuel supplies, all fuels, (i.e. primary energy forms) summed up by domestic and foreign supplies (Figure 8). In 1970, we met our fuel requirements with about 88 percent domestic fuels and 11 percent foreign. Under the assumptions of the initial case, our domestic fuel supplies grow at a rate of 2.6 percent per year. As a consequence, by 1985 we would meet only 70 percent of our requirements with domestic supplies and 30 percent would be imported.

Looking now at liquid petroleum (Figure 9), in 1970 domestic supplies consisting of crude oil, condensate and natural gas liquids totaled 11.3 million barrels per day, which was 77 percent of our requirements. Despite an addition of two million barrels per day from the North Slope and another 2.7 million barrels per day from new discoveries to be made after 1970, total U.S. production in 1985 was estimated at only 11.1 million barrels per day. Therefore, in order to meet growing demands for petroleum liquids, imports would have to grow from 3.4 million barrels per day in 1970 to 14.8 million barrels per day by 1985. At this point imports would constitute 57 percent of our total petroleum supplies. Most of this would have to come from Eastern Hemisphere sources, because of the limited potential for increased imports from Western Hemisphere sources.

In the absence of supply limitations, potential gas demand would grow from 22.7 trillion cubic feet in 1970 to 38.9 trillion cubic feet in 1985 (Figure 10). However, even with North Slope gas, some synthetic gas from coal, Canadian imports and LNG imports, gas supplies in 1985 under initial case assumptions would total only 21.5 trillion cubic feet. The shortfall in energy supply between potential gas demand and available gas supplies would

# Domestic and Foreign Fuels in U.S. Energy Supply

(Quad. BTU)

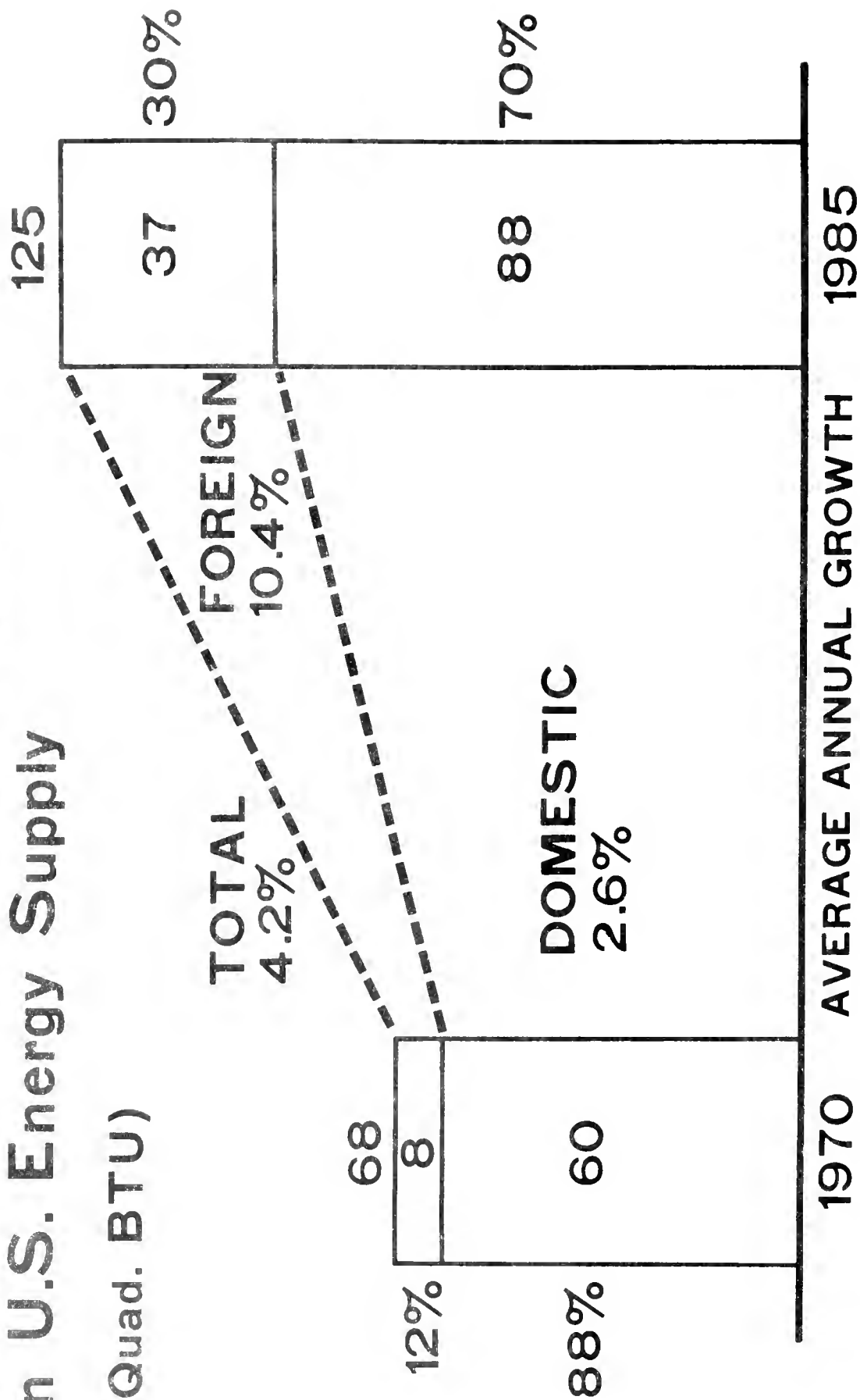


FIGURE 8

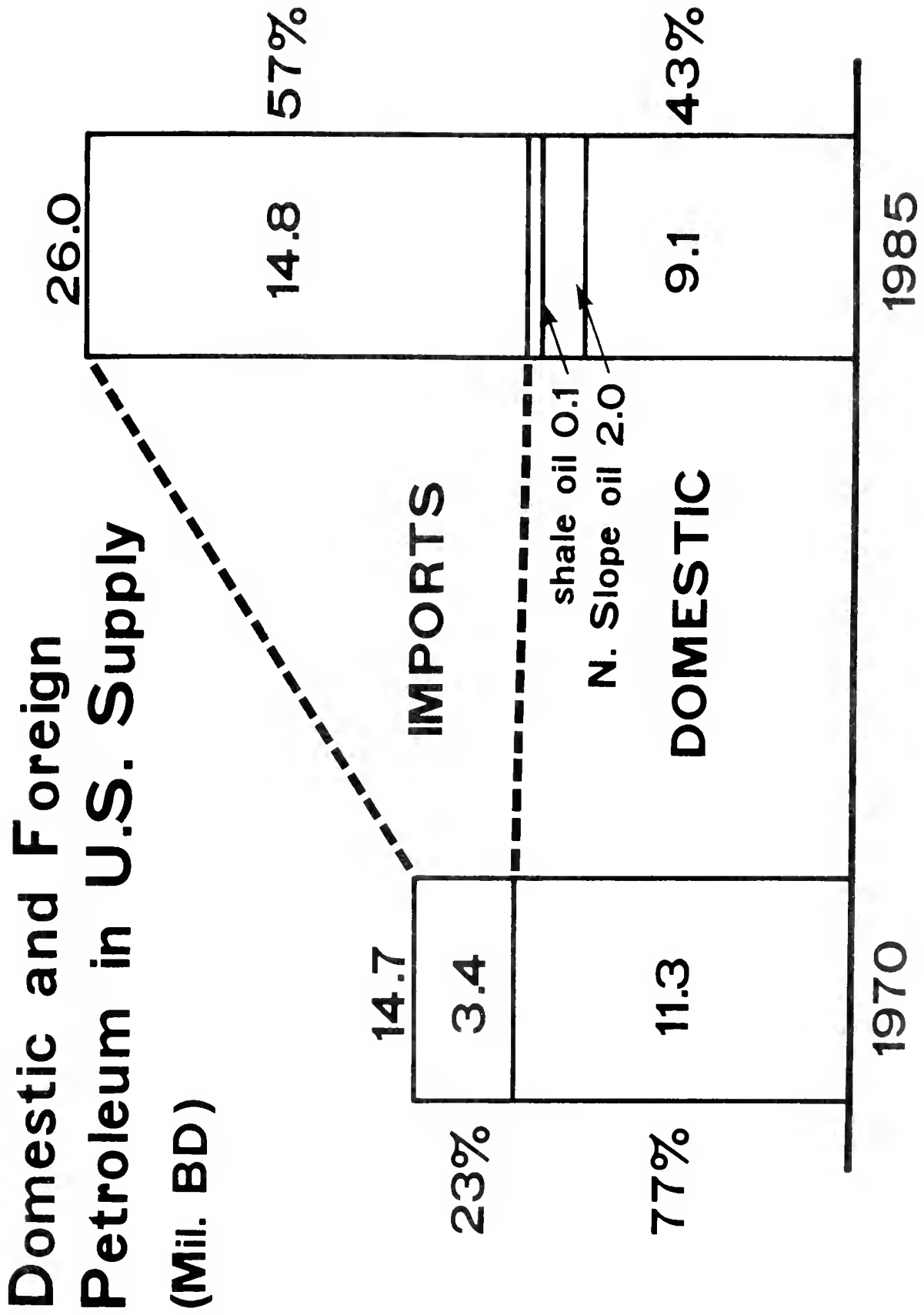


FIGURE 9

# Domestic and Foreign Gas in U.S. Supply

(Tril. cu. ft.)

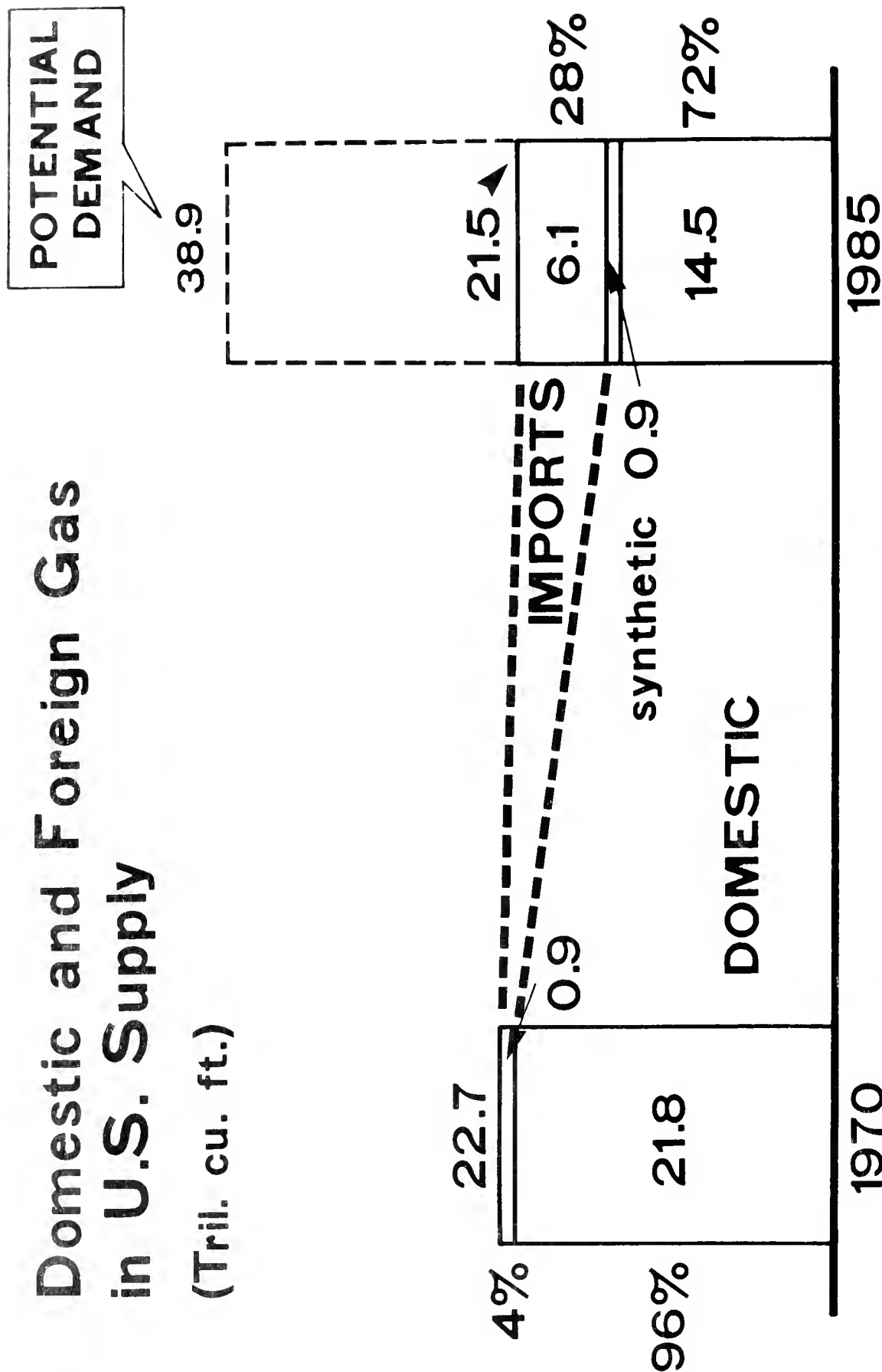


FIGURE 10

have to be made up from increased supplies of other fuels.

Coal requirements (Figure 11), including exports, are projected to grow from 590 million tons in 1970 to a little over one billion tons in 1985. The ability of the coal industry to do this depends on the availability of manpower and transportation facilities and assumes that the industry can meet health and safety regulations and that technology for the control of sulfur dioxide emissions will be developed.

Nuclear power (Figure 12) is projected to increase from 23 billion kilowatt hours in 1970 to over 2 trillion kilowatt hours in 1985. This projection is consistent with the estimates of the Atomic Energy Commission. Achievement of this level would depend on resolving delays from siting, environmental and construction problems. No shortage of domestic fuels was foreseen, assuming uranium oxide prices of up to \$10 per pound.

Other fuels of significance in this period are hydropower and geothermal (Figure 13). These fuels are expected to contribute only 3 percent of our energy requirements in 1985, growing from 250 billion kilowatt hours in 1970 to 367 kilowatt hours in 1985.

It should be noted that to meet these requirements large volumes of water will be needed both for electric power plants and plants for the production of synthetic oil and gas. Water will especially be needed in relatively arid areas of the western states. To meet those needs, legal and jurisdictional disputes will have to be resolved.

In order to achieve the initial appraisal energy balance (Figure 14), capital outlays for resource development, manufacturing facilities and primary distribution would have to total 374 billion dollars over the 1971-1985

# Coal Production for Domestic Use and Export

(Mil. Tons)

EXPORTS

DOMESTIC USE

116

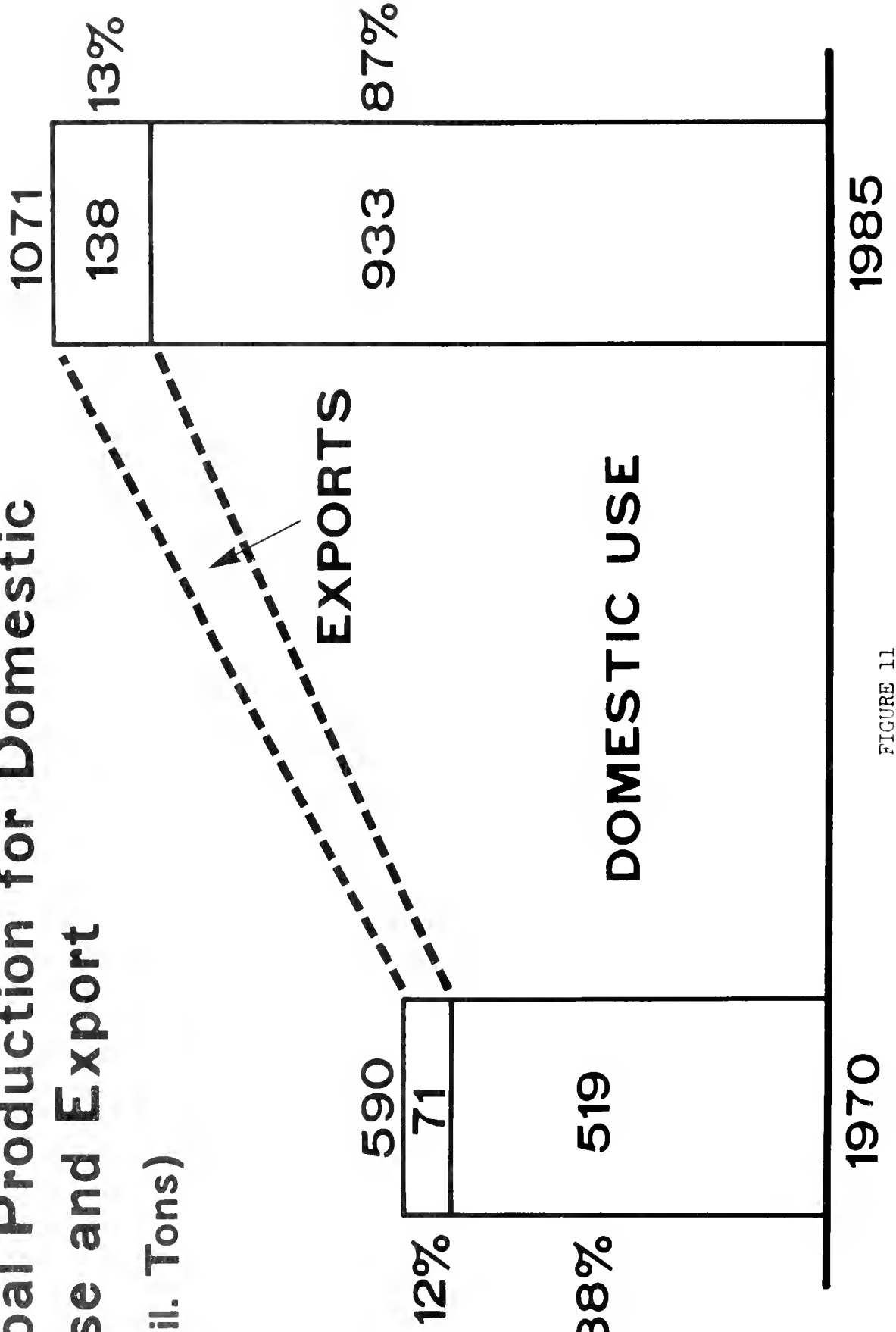


FIGURE 11



# Nuclear Generation of Electricity (Bil. KWH)

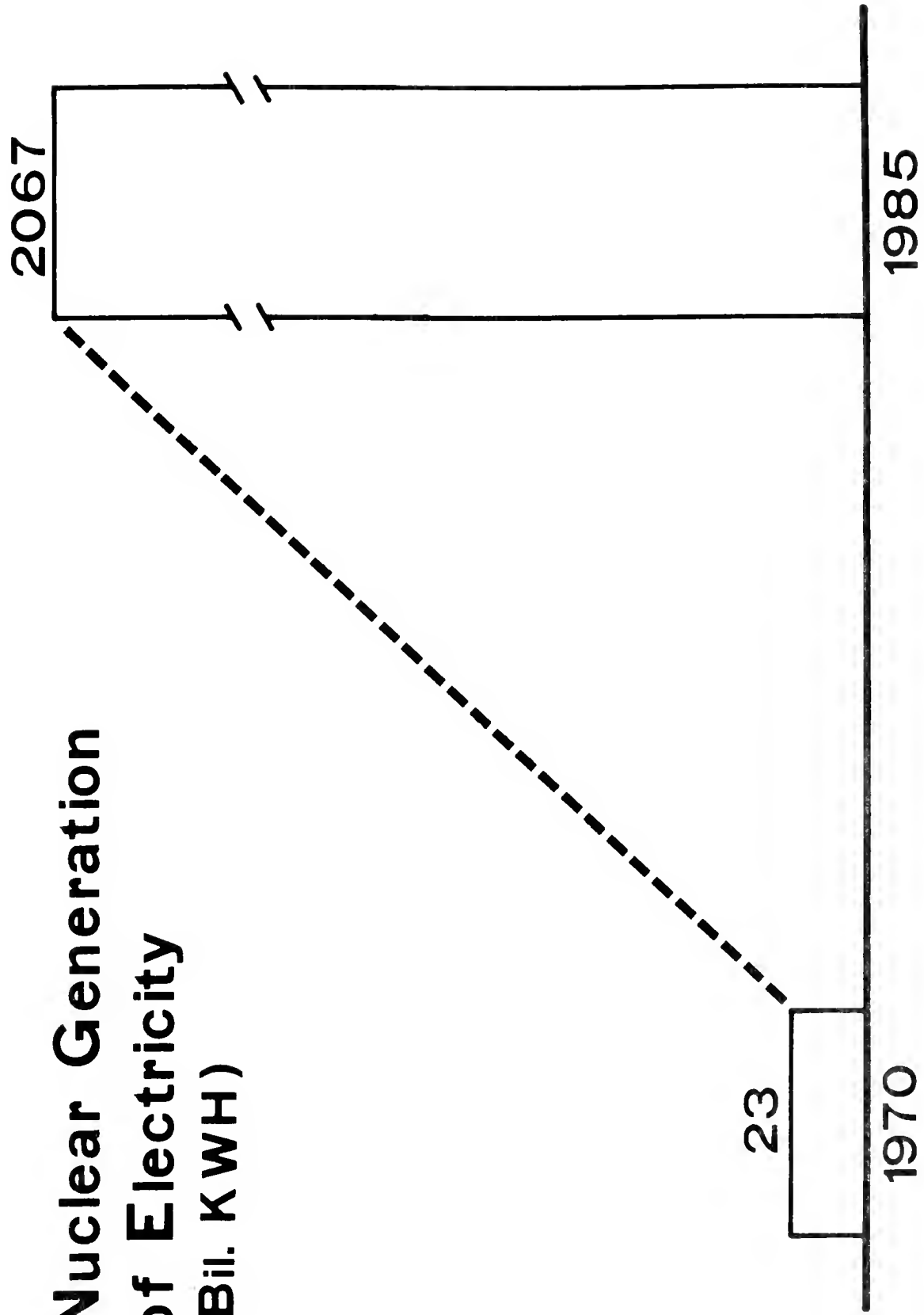


FIGURE 12

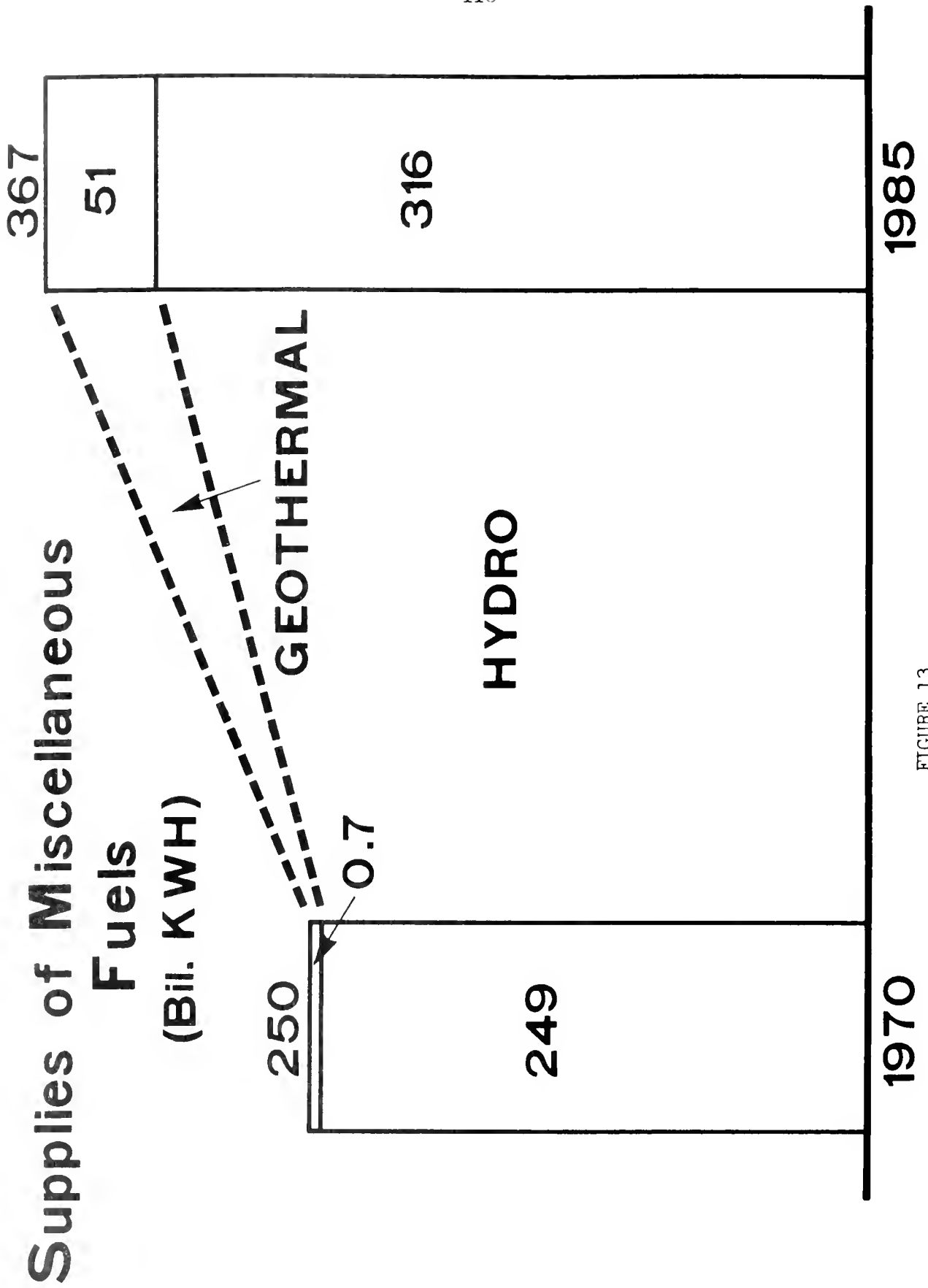


FIGURE 13

# Capital Requirements

## Initial Appraisal

### 1971 - 1985

#### TOTAL \$374 BILLION

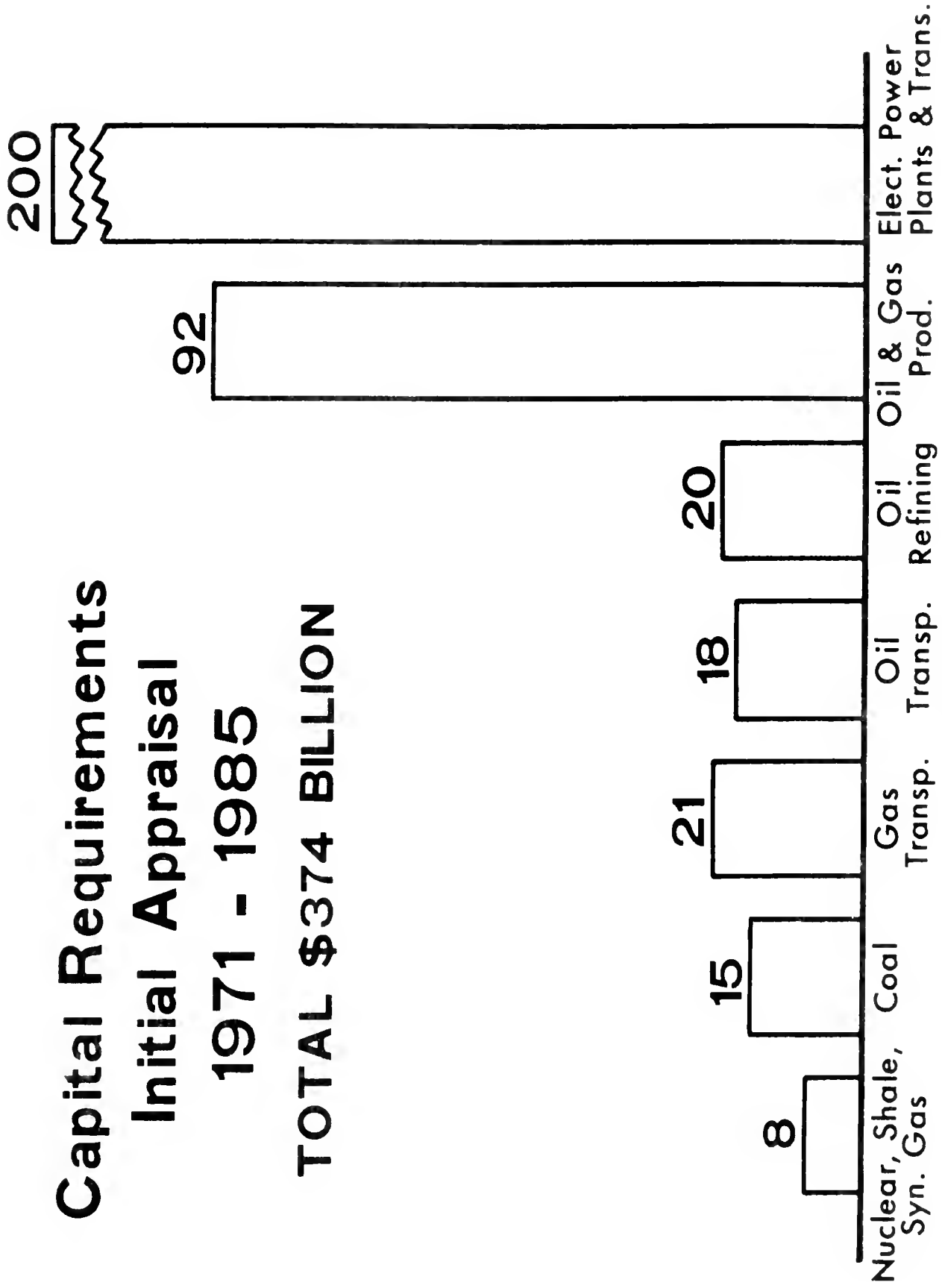


FIGURE 14

period. By far, the largest items are electric power plants and transmission systems and oil and gas-producing facilities. Substantial sums would also have to be invested in oil and gas transportation, oil refining, coal production, coal transportation and nuclear fuel production. Not included in these figures are other major sums for petroleum marketing, gas and electricity distribution, and the development of overseas natural resources needed to satisfy U.S. import requirements.

Several implications can be quickly drawn from this assessment (Figure 15).

In the long run, all of the indigenous energy supplies that can be developed in the United States will be needed to meet our expanding requirements. Fortunately, our basic potential energy resources, particularly for coal, nuclear fuels, petroleum liquids and natural gas, are very large and could support much higher levels of output than projected in this initial appraisal. In the judgment of the Energy Committee, however, these resources are not likely to be developed to their full potentials without significant changes in government policies and economic conditions.

No attempt was made in this report to assess the extent to which indigenous supplies might be increased by appropriate changes in government policies and economic conditions. This will be done, as I indicated earlier, in Stage II of the Committee's work scheduled for completion in December.

At this time, however, it is appropriate to note certain areas of concern implicit in continuation of existing conditions. These items can be placed in four categories:

## **Basic Implications of Initial Appraisal**

- ALL INDIGENOUS ENERGY SUPPLIES WILL BE NEEDED.
- U.S. ENERGY RESOURCES COULD PROVIDE GREATER AVAILABILITY OF DOMESTIC SUPPLIES.
- SUCH SUPPLIES NOT LIKELY TO BE FORTHCOMING WITHOUT SIGNIFICANT CHANGES IN GOVERNMENT POLICIES AND ECONOMIC CONDITIONS.

FIGURE 15

1. Continuation of present government policies (Figure 16) would clearly result in a sharp rise in national dependence on imported energy sources, particularly petroleum liquids. This will require careful assessment in respect to national security aspects and impact on the U.S. balance of payments. Furthermore, the United States cannot expect indefinitely to be able to increase imports of foreign oil. Towards the end of the century, foreign supplies may prove insufficient to meet all potential demands.

Continuation of present government policies would also result in available gas supplies being equal to only about one-half of market requirements in 1985. In view of the fact that we have substantial undiscovered domestic reserves, a critical review of natural gas price regulations and other parameters impinging on the incentives of expanded exploratory efforts is clearly in order and urgently needed.

2. The nearly doubled energy requirements in 1985 will require enormous additions of new facilities (Figure 17) which will not easily be forthcoming under existing political, social and economic conditions. In petroleum, for example, the importation of an additional 10-11 million B/D of overseas crude oil and products would require the equivalent of more than 350 tankers, each of 250,000 dwt. No. U.S. ports are presently equipped to receive such tankers, so major new terminals would have to be developed in coastal areas. Similarly, the increase in refined products requirements would necessitate

# **Implications of Initial Appraisal**

## **NO. 1 : CONTINUATION OF PRESENT GOVERNMENT POLICIES WOULD RESULT IN:**

- SIGNIFICANTLY INCREASED DEPENDENCE ON OIL IMPORTS  
WITH COINCIDENT NATIONAL SECURITY AND BALANCE  
OF PAYMENT PROBLEMS.
- SERIOUS SHORTFALLS IN GAS SUPPLY; REVIEW OF GAS  
PRICE REGULATION URGENTLY NEEDED.

FIGURE 16

## **Implications of Initial Appraisal**

### **NO. 2 : REQUIRED NEW FACILITIES WOULD BE ENORMOUS**

- OIL: TANKERS, PORT FACILITIES, REFINERY CAPACITY
- GAS: LNG TANKERS, LIQUEFACTION FACILITIES
- COAL: NEW MINES, TRANSPORTATION NEEDS
- NUCLEAR: 30 PLANTS PER ANNUM, 1980—1985

FIGURE 17



net additions of about 10 million B/D to domestic refining capacity over the 15-year period. This would involve construction at about 2.5 times the rate of the past decade.

The new facilities which would be required in the gas, coal and nuclear fields are of equally impressive magnitude.

3. The annual new capital investments which would be required to finance the development of natural resources and the construction of new facilities would greatly exceed the levels of recent years (Figure 18). The required funds cannot be provided from the operations of the energy industries at the present price levels. Environmental constraints will further affect supplies and increase investment costs. All of these things imply substantial increases in energy costs in the future.
4. The doubling of energy consumption (Figure 19) the next 15 years implies many new technological challenges. A sharp step-up will be needed in all kinds of measures to protect the environment both at points of energy production and energy use. The development of new methods for exploration, mining, resource recovery and transportation will have to be accorded a high priority. Similarly, increased technological effort will have to be directed to the development of new energy sources and techniques for energy conservation.

## **Implications of Initial Appraisal**

**NO. 3 : FINANCIAL REQUIREMENTS LARGE AND NOT EASILY  
ATTAINABLE.**

- WOULD GREATLY EXCEED RECENT LEVELS OF CAPITAL INPUT.
- CANNOT BE GENERATED INTERNALLY AT PRESENT PRICE LEVELS.
- RISING ENERGY COSTS CLEARLY IMPLIED.

FIGURE 18

# **Implications of Initial Appraisal**

## **NO. 4 : MAJOR NEW TECHNOLOGICAL CHALLENGES.**

- ENVIRONMENTAL PROTECTION
- IMPROVED METHODS: EXPLORATION, MINING,  
RESOURCE RECOVERY, TRANSPORTATION
- NEW ENERGY SOURCES
- ENERGY CONSERVATION

FIGURE 19

With respect to all of these matters, it is extremely important to note that long lead times are involved in the orderly development of energy resources. It is essential, therefore, that the many considerations bearing on the selection of an optimum national energy posture be brought into sharp focus at the earliest possible date.

It is not a matter of one side against the other any more---it is imperative that all of us work for a solution together. The rhetoric and the roadblocks must be stopped and reason must be adopted.

Secretary Morton summed up the problem that his Department faces in the mixed advice he is getting from all segments of the public and private sectors including conservationists, industry, consumers, and other agencies of government in the formulation of energy policy. Taken together, he said, this advice comes out as follows:

Give us an energy policy that is intelligent and concise and, above all, responsive to the interests of the Nation as a whole. Give us a policy that can apply to the short-term and to the longer term as well. Give us an energy policy, they say, that will provide the consumer with the type of fuel he wants, in the amounts he needs, at the time he must have it, and at the lowest possible price. Assure us this energy will be from secure and reliable sources. But don't drill offshore of my coastline, don't build any pipelines across my land, don't strip-mine any coal, don't build any refineries or storage facilities in my area, abolish the oil import program but don't move oil in by tanker for this might pollute our waters. Give us an energy policy that guarantees protection of the environment, where the use of energy does not intrude upon our esthetic values nor damage the ecology of the land. Give us an energy policy that will maximize national security yet not impinge upon normal trade between nations.

Obviously, there is no simple solution, but the position is taken by the National Petroleum Council that our requirements can be met both in

the environmental and energy fields. One need not fall by the wayside at the expense of the other. The energy that the Nation requires can be provided, at the same time high environmental standards are achieved and maintained. But the Nation needs an energy ethic just as it now has an environmental ethic.

## CULTURAL CHANGES

by Walter T. Martin  
Director  
Center for Ecological Studies  
University of Oregon  
Eugene, Oregon

The theme for today's discussion is "The Human Element," and it is here that the crux of the environmental problem lies. The environmental problem has less to do with the quantity and quality of natural resources than with the human use and abuse of these resources and, indeed, of the total environment.

Man is a creature of endless needs. If we ask how this species survives in a limited and often unfriendly environment, the answer is through social organization to exploit the environment; and this exploitation is accomplished and controlled through culture. Culture encompasses two broad areas -- technology, i.e., equipment and know-how necessary for getting the job done, and ideology, i.e., the beliefs, values and norms of conduct which govern all social behavior including how technology is used. The relationship between these variables are reciprocal. In general, as technology changes social organization and ideology are modified -- witness the impact of the automobile, but social organization and beliefs and values also direct, control and modify the nature of technology and the way technology is used. These variables, in combination with the size of the population, represent man's

impact on his environment.

Our specific task is to consider social and cultural changes currently taking place in American society that seem destined to modify the pattern of man's resource use in coming years. We will first identify a number of well established, persisting trends that will almost surely continue on through the present century even through with decreasing momentum. Then we will consider some contemporary developments which may possibly gather sufficient sustained force to qualify as sociocultural changes of some import. Reading the future impact of these developments is most difficult.

At the outset it is essential that we see American society in its full complexity -- a large, complicated socio-economic system comprising an endless variety of subsystems and components, many with conflicting objectives and incompatible modes of operation. It is this social system which organizes the population in its operations within and upon the total environment so as to provide sustenance and other survival needs. It is the nature and consequences of these operations "within and upon the total environment" that is of so much concern today.

Strangely this concern, often accompanied by bitter criticism, is focussed directly upon mankind's success in achieving fulfillment of his primary objective -- the provision of goods and services to raise the level of living above sheer survival. And also, of course, on the impact of this success upon the total environment. Criticism is centered on culture, on technology itself but especially upon ideology -- that is upon the system's underlying assumptions, values and beliefs, and modes of operation, since these seem to determine the perception of the environment and manner of relating to it.

While it might be said for many societies, nowhere is it more true than in the United States that present values, beliefs, and norms of conduct were forged in an era of simple technology, rural settlement, little specialization of labor, small scale operations, and scarcity of material goods. Given the conditions that existed at the time American society was evolving there can be no surprise at some of the underlying assumptions, values and beliefs that became firmly established. For example, it was self evident that land and resources were boundless; and if they were depleted locally one simply moved further west. The greatest good for the whole was to be achieved by each person working selfishly for self and family. Christianity taught that man was meant to be master of all aspects of his environment (White, 1967:1205-1206), while "Protestantism yielded an ideal of self-reliance, energy, and disciplined secular life to carry out God's work on earth. The Protestant ethic would thus drive toward economic enterprise, trade, and the formulation and use of capital" (Ryan, 1969:34). Thus, there should be no interference with efforts toward personal gain or profit. The best government governed least. In short, man was meant to conquer nature. But in addition, nature was so bountiful that the most rapacious attacks were of no great consequence. I am not suggesting that all persons behaved in accordance with these norms, but that there were few restraints upon those who did.

As the United States was transformed from a small agrarian nation to a highly urbanized, technological society, the nature of the relation between society and its environment changed drastically. A rapid increase in population and population concentration, a radical change in the nature



and effectiveness of technology, continuing increases in purchasing power and effective demand, and sharp increases in energy needs, all combined to make possible and encourage destructive inroads on all aspects of the environment. While many beliefs and values were modified to be congruent with this technological society, the traditional view of man as the conqueror of nature remained remarkably constant down through the midpoint of the twentieth century. True, there were occasional cries of dismay, the development of the conservation movement, the setting aside of areas for national parks, and periodic attacks on the "Robber Barons," but these events had little impact on American conduct toward the environment.

#### Some Well Established Sociocultural Changes

In a society as dynamic as the United States, and particularly during the restless years of the past decade, it sometimes seems that change is everywhere, and as shifts and modifications are identified spokesmen step forward to proclaim each one a major wave of the future. Lacking a comprehensive system of social indicators we have little more than intuition and common sense to indicate whether an observed innovation or deviant event is an isolated, unique happening or the first muted sounds of an approaching avalanche. Consequently we tend to ignore those changes that have been with us throughout our lives, and to focus our attention instead on more novel and dramatic developments, some event at disjuncture with the usual pattern, or some happening that holds apparent threat or promise for our future. How are we to know which of these history will find inconsequential? The futurists may well be making progress, but as yet we

can safely assume only that many of the events currently exciting the imagination of the public (and of social scientists) will be forgotten or judged of little consequence by the end of the decade.

Thus, if we seek to identify the major social and cultural changes underway in American society we would be wise to start with those trends that are well established and thoroughly verified. A recent review of current sociocultural changes identifies the following as having been underway in the United States for at least one hundred years (Caplow, 1971; 629-647).

1. Technological development with an ever increasing emphasis on high energy convertors, high speed computers and automation.
2. Diffusion of this advanced technology to all parts of the United states and all countries on the globe.
3. Urbanization and suburbanization, that is metropolitanization of the population.
4. Occupational specialization with a continuing increase in the number of occupations and more complicated relations among them.
5. Decreasing work effort: fewer hours per day, fewer days per week, fewer weeks per year, and fewer years per life span (i.e., more hours of leisure).
6. Increase of symbols and images via books, newspapers, radio television, motion pictures and other forms.
7. Increase of goods -- a continuing and seemingly limitless increase in the amount, complexity, and variety of available goods.

8. Increase of services -- welfare, educational, medical, research and planning - made possible by the high per capita supply of material goods.
9. Population expansion -- at a slower rate in recent years but almost certain to continue for another seventy years even though at a diminished rate.
10. Intensified spatial mobility -- a continuing increase in the volume, speed and range of human mobility.
11. Increasing severity of war -- graphically documented within the life span of the present generation.
12. Expansion of government -- despite the sharp increase in governmental function, the United States has a long way to go to match other countries in the number of functions and the proportion of the population employed by the government.
13. Erosion of traditional cultures -- largely as a result of increased national exposure to symbols and images, great spatial mobility, and redistribution of the population, sectional and ethnic differences are being minimized.
14. Equalization of the sexes and races -- the least stable and clear-cut of the trends mentioned here but almost certain to continue with increasing effect.
15. Decreasing autonomy of the natural environment -- with the exception of the last two or three items, this is the end result of most of the social trends listed above.

A likely response to this list might be, "So what? There is nothing new there." But that is exactly the point! These social and cultural trends have been underway for at least a hundred years; they are intricately intertwined and interlocked in such a way that in many cases one can not exist without the other; and there is no reason to expect these trends suddenly to stop, let alone become reversed. Indeed, these developments proceed without control and may be uncontrollable. Each of these trends seems likely to continue, probably at reduced speed and intensity, for several decades, perhaps another century. There has been no instance of a society de-urbanizing or de-industrializing except as this may be the consequence of war or other catastrophe; but we may be quite certain that rapid change toward a less technological society with a simpler division of labor and greater dependence on an agricultural base would require or bring about a sharp decrease in the population.

An elaboration of these major, long range trends would be a statement of the nation's great achievements, but it would also be a description of developments that lie at the heart of the nation's problems of resource utilization and environmental degradation. Thus, the continuation of these social and cultural changes for another several decades is crucial to the environmental problem. Consider only one example -- the continuing metropolitanization of our population. There have always been those who have abhorred city life and have urged measures to slow down or reverse the trend of urbanization. It is easy to build a strong case for such action. But, despite the widespread diffusion of knowledge about bad urban conditions, each decennial census finds that about half of the nation's counties have

actually lost population as people continue to concentrate in metropolitan areas. This trend is not about to be reversed, and continuing metropolitanization means greater pollution potential, greater pressure on natural resources of certain types, and almost certainly more vigorous and more effective action to regulate acts that impinge upon the environment in a negative way.

There are those who would like to believe that technology, specialization of labor, urbanization, and all of the rest can somehow be whisked away. This will not happen. However, to say that these on-going social changes will persist is not to assert that they will necessarily continue without change in form and content. Indeed, to take metropolitanization as an example, this process carries its own seeds for change. Sheer survival will force us to come to grips with our metropolitan areas. What I see happening is not a decline in urbanization but the combining of technological and organizational skills in the development of more livable cities that are less destructive to the environment; not a moratorium on technological development but the establishment of some discipline over technology; not the elimination of "free enterprise" but an universal system to eliminate the profits that can be achieved through environmental degradation and destruction. These developments have major implications for resource utilization.

#### Some Less Well Established Changes

Now, what developments in recent years can be considered as possible but inadequately confirmed social and cultural changes? Caplow (1971:47-652)

discusses eleven examples: increasing anxiety, breakdown of social values, increasing anomie, increasing deviance, increasing political violence, decline of the family, decline of religion, status equalization, cultural homogenization, global interdependence, and accelerating rates of social change. As yet there is no solid confirmation of any of these alleged changes; and furthermore most of these developments would seem to have only minor bearing on resource utilization. The same could be said for a variety of other changes.

Among the welter of developments taking place about us is one not included in Caplow's list, but one I believe warrants particular attention. Like Caplow's list of possible sociocultural changes this development is largely a reaction against the confirmed, long range changes, although it is too recently upon the scene for us to be certain of its life expectancy. In contrast to Caplow's listed items, however, this development appears to possess major potential for a powerful impact upon the way Americans treat their environment. I speak of the environmental movement -- a generic term to cover a wide and diversified variety of individuals and groups who seek to change the way we use and abuse our environment. The development of this movement during the 1960's has been analyzed by Schnaiberg (1971) and we will not duplicate his effort.

In a recent volume contemporary social movements are described as decentralized, segmented and reticulate (Gerlach and Hine, 1970:37). These adjectives aptly describe the environmental movement. It is decentralized to an extreme with diverse organizations appearing and fading from the scene, but with these dissimilar segments somehow linked into regional and

national networks that have shown considerable toughness and resilience. Environmentalists include a great diversity of types and they are not always lovable. Like others who are certain that they, and only they, are working to save humanity -- and in their case the entire globe -- environmentalists are sometimes arrogant, abrasive, inconsiderate, and iconoclastic, not to mention opinionated, self-righteous, and naive.

Having said this, let me add that in my judgment environmentalists are generally correct in their major broad objectives. Furthermore, they are becoming more sophisticated and increasingly effective in their operations. It remains to be seen whether the social and cultural modifications they seek add up to a major sociocultural change; but the potential is undeniably there. I say this because of the causal connection between the rise of environmentalist sentiments among the general populace and the long range, on-going changes mentioned above. That is, it is now widely recognized that, in one sense at least, these long range changes have resulted in major over-achievement in the production of goods and services and the result of this is unparalleled waste. In another sense, the result must be regarded as a failure since large segments of the population fail to share in this abundance except as token amounts are doled out through various forms of welfare, again with a resulting waste of human, social, and natural resources. In still another sense, the total impact of these established trends may be regarded as an actual threat to human survival because of the destructive impact on the natural environment.

As these negative consequences of our system have become widely recognized, strong reactions have become increasingly evident throughout society. I expect these pro-environmental sentiments to continue to grow and spread, not because of some mysterious expansion of Consciousness III, but because day-by-day the average American citizen is brought face to face with unpleasant things that are happening to his environment. Pro-environmental sentiments are by no means new in America and given the proper conditions there is no reason why they should not flourish. Indeed, over the past few years the polls have shown repeatedly and with great consistency a strong and growing environmental sentiment and a deep concern about damage to the environment (National Wildlife Federation, 1970; 1972). While these sentiments are expressed most strongly by the young, the better educated, and those living in large cities, they are widely diffused throughout the population. Furthermore, respondents to a poll conducted in 1972 for the National Wildlife Federation generally underestimated the present actual costs of air and water pollution to the American people. This suggests that continuing education on such matters should produce an even stronger sense of concern in the future.

Needless to say, the ascendance of pro-environmental values would constitute a cultural change of great significance since these values are in sharp conflict with the values that have long dominated the relations of this society to its environment. Indeed, value conflict is the key phrase to describe our present situation. These conflicts are not only between the values of different individuals and groups. Many of us find ourselves being torn apart by conflicting values that we have internalized.



What are the ways in which the environmentalists have been seeking changes with implications for resource use? There are four areas which have been attacked.

Direct Attack upon Pollution. A direct attack upon pollution is appealing and satisfying because it is something the individual can do on his own as well as through collective action. As an individual he can ride a bicycle or buy a small car and use unleaded gasoline; he can produce organic food in his own back yard, recycle cans, bottles and other wastes; and above all perhaps, limit his offspring to two or less. Through collective action he can clean up waterways and roadsides, expose, boycott, and otherwise pressure those who pollute. While to date such activities have served primarily as sources of personal satisfaction, pursued over a period of time by a sufficiently large number they can bring about changes in industrial practices.

Direct Attack upon Selected Resource Abusers. A direct attack upon resource abuse or misuse has also proved to be an attractive avenue for individual action. Again the individual can adopt a life style that boycotts those concerns that are notorious for their abuse of resources. As a member of a group he can publicize, picket, boycott, write letters and otherwise seek to modify or limit resource use. Government agencies, and industrial and business concerns have found it virtually impossible to ignore public spotlighting of questionable practices.

Direct Attack on Established Trends. A third possibility would be a direct attack upon the long range, established trends. This may appear

to be an attractive target because to a large extent these trends underlie present resource uses and pollution practices. To attack here seems to be getting at basic causes. However, there appears little likelihood of success in bringing these continuing cultural changes to a halt. One exception is the recent sharp decline in the birth rate, and what has happened here may reveal the real power of the movement. In this case births have continued to decline despite an age composition very favorable to high fertility, and for the first time the nation is producing children at the bare replacement level -- 2.1 children per couple. However, the age composition is not favorable to high mortality and zero population growth is several decades away. At the least we must expect about a fifty percent increase before the population stabilizes.

I see no basis for expecting even a moderate decline in occupational specialization, technological development and diffusion, increasing goods and services, or metropolitanization, even though many identify these as major sources of "social problems." It is very unlikely that any sizable proportion of the population can be mobilized to work for such changes in view of a general recognition of the material advantages yielded by an advanced technological society. At the same time, however, people are generally concerned about specific problems associated with technology (Harris and Associates, November 1970). Indeed, the level of concern is sufficiently high that considerable support can be brought to bear against specific engineering developments that are seen as serious environmental hazards, e.g., the SST and ABM. The successful attacks are those upon the use of technology, not upon technology itself. The greatest public support can be mustered against practices which threaten the environment in obvious ways.

Direct Impact on Government. The most effective way to achieve major, long range modifications in practices involving resource use and pollution is through the political process. In the United States only government has the power to supervise, reward, penalize, and otherwise control on the scale necessary to achieve these objectives. The most sophisticated environmentalists are following this avenue. Again, there are individual actions that can be taken. Undoubtedly, however, the greatest impact here is through collective action. On the state level there are private organizations such as the Oregon Environmental Council and state agencies such as the Department of Environmental Quality, with corresponding private and public organizations at the regional and national levels. In some areas industry is providing leadership. Such organizations have demonstrated genuine political clout and this strength rests upon considerable support among the general public.

We have said there are different types of environmentalists. Schnaiberg (1970) found it useful to classify them in terms of their philosophies, sophistication and methods as cosmetologists, meliorists, reformists and radicals. Each type has a different impact but at this point the most effective in bringing about changes have been the "reformists" who operate at quite a sophisticated level within the system -- that is, through the legislatures and courts, and by organizing political and public pressure on major offenders. It is true that they have often failed to achieve their objectives; as we see in the 92nd Congress which has been described as the "one that talked the most about the environment and accomplished

the least" (Benson, 1972).

Nevertheless, impressive battles have been won. Thus, in my state people not only ride bicycles in great number but by an act of the legislature one percent of all monies collected through the state gasoline tax must be spent on building bicycle routes and paths. Legislative action favorable to cyclists has been passed or is pending in other states. Similarly, individual and collective efforts to recycle cans and bottles and to clean up waterways, highways and forest areas, will be greatly advanced in my state by the "bottle bill" which outlaws pull-tab cans and requires a deposit on many beverage bottles and cans. Around the nation actions within the political process and in the courts are achieving corresponding results at local, state and federal levels. Clearly these legislative changes are forerunners of resource change.

One result of the increasing concern over the uncontrolled nature of technology is search for mechanisms for regulating technological development. Among private industries and in many areas of government there is a rapid spread of "technology assessment" -- "a formalized attempt to forecast -- and thus prevent -- bad side effects from good machines" (Large, 1972:18). A number of industrial concerns are entering into such analysis, but perhaps more important, Congress is setting up its own Office of Technology Assessment to provide technical assistance to its members. Committees in the House or Senate faced with technological problems will take these problems to this office for technical assessment. Hopefully the Office of Technology Assessment will provide Congress with impartial assessments of the potential impact of new machines on the environment, something Congress cannot achieve without assistance. We are describing here a social invention to meet a critical

need -- means of assessing and guiding technological growth. It is no panacea, since any office which attempts to provide "impartial assessments" to Congress is certain to become a major focus of cross pressures from industry, congressmen, and environmental groups. Nevertheless, it is a potentially important socio-cultural change whose development is apt to have considerable affect on future decisions regarding the environment and resource use.

### Conclusion

We have described a number of long range, well established and inter-related sociocultural changes which are closely associated with the transformation of American society. These trends are expected to continue for several decades, although probably at decreasing speeds and with modified form and content, partly because we have little or no control over them and partly because the majority of Americans welcome their benefits even while decrying their consequences.

Of various other happenings that might possibly have the potential for developing into full fledged sociocultural changes with major implications for environmental use, we selected the environmental movement. Continuing growth and strength in this movement is anticipated precisely because it seeks to counteract or control the adverse effects on the environment of the continuing established trends. It becomes increasingly impossible for citizens of all walks of life to escape the conclusion that their environment is being destroyed, whether by strip mining in Kentucky and Montana, the destruction of a favorite river by industrial wastes, the pollution of air and landscape by automobiles, or the proposal to place a

public privy atop Mt. Rainier's once pristine peak. The effect of this is a growing support, tacit or outspoken, for those environmentalists who demonstrate ability to achieve results by working within the system. This is a movement whose time has come. When the faddist element is washed out there will remain a strong movement growing broadly from all walks of life and dedicated to enforcing new norms of conduct toward the environment.

The inescapable consequences, as I see them, are additional controls and restrictions over those activities that have the greatest negative impact on the environment. This certainly includes most extractive and manufacturing activities. In a democratic society working out change in resource use requires positive efforts -- education, incentive programs, and rewards. Given the traditional freedom of Americans to abuse their environment as they see fit, the necessary controls can only be regarded by some as revolutionary and intolerable. The situation is not helped by the conviction shared by some environmentalists that only drastic action taken today will save the world. More moderate elements on both sides will find much that they can agree upon, and when the need arises man is an inventive creature! The situation calls for social inventions -- new ways of organizing our activities to achieve a balance between the twin objectives of safeguarding our environment and safeguarding our livelihood. I am neither overly optimistic nor unduly pessimistic about our ability to pull off these difficult tasks.

Whether we like it or not, the painful process of hammering out a new environmental ethic is actually getting underway. And this may represent the greatest challenge of the century. It is certain to be the crucial task of the second half of the century.

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## FEDERAL AND STATE STATUTES

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We are together today to examine the topic, Constraints to Natural Resource Development. I, as a representative of an environmental regulatory agency, have been asked to contribute to this examination.

For the past two years, I have been the Director of the Refuse Act Permit Program within the Environmental Protection Agency. A permit program, I believe, is the ultimate form of regulation or constraint. By its operation, a permit program allows only those industries which can comply with its stated rules and regulations the opportunity to operate and conduct business to make money.

Before proceeding further, let me offer a definition of pollution which will guide my discussion today. The Council on Environmental Quality has stated that pollution occurs when materials accumulate where they are not wanted. A pollutant, therefore, can be a valuable resource out of place (1).

It is the objective of a regulatory body such as the permit program to make certain that materials do not accumulate where they are not wanted and where they can produce a harmful result. The goal is to limit the



free and unthinking use of resources and to channel them to some socially determined, beneficial end. Society is now attempting to design a system in which valuable resources are used in their proper place.

The need for careful planning of resource use applies not only to the extractive industries, such as mining and lumbering, but also to any industry on or in close proximity to navigable waters and whose activities have harmful affects on those waters.

Water is the essential ingredient in the industrial process. It is its life blood. The Permit Program which I direct will limit, as a direct effect, the manner in which water is utilized.

States have long recognized the merits of permit systems in regulation and control of waters. To this extent, they have been ahead of the Federal Government.

Maryland, in 1914, established the first permit system (2). Montana established its program in 1947 (3). Today, 47 states possess some form of a permit system in which the water discharger is controlled, a written permit is required in order to perform some desired discharge, and some form of State water quality agency is in existence (4).

A permit program is an efficient means of regulation. To enforce the system, the agency must merely prove that the accused was conducting a proscribed activity and that he had no license or permit to do so. The quality or impact of his act is not relevant.

Great leverage can be applied through a permit program for the issuing agency normally has the power, first to condition receipt and retention of the permit on the permittee's compliance with certain

requirements and secondly, to withdraw or modify the permit for non compliance with requirements necessary to protect water quality.

Because every State has its own legislative treatment of environmental areas, it is of questionable value to explain the laws of any one, or a number, of the States. Further, so rapid are the modifications of environmental law going on in this country, to attempt to explain any one State system in detail might be an exercise in history by the time I read this. This has held true in the Federal realm.

As an illustration of the variety of scope and coverage of the individual State permit programs, let me give the following illustrations.

Most State permit programs apply to all types of discharges. Montana's program covers "sewage, industrial wastes, and other wastes" (5). It is an inclusive provision.

However, one State, like the Federal program, only has application to industrial discharges (6). While others create exemptions for special classes of discharges (7). Most State programs fail to cover accidental discharges adequately. They focus mainly on intentional discharges. This creates an important gap, especially for those industries which still transport toxic or hazardous materials in close proximity to the water.

Michigan uses a grandfather clause which exempts from permit requirement, discharges already in existence at the time of the bill's enactment. This is said to effect nearly 800 dischargers who operate without a permit (8).

Also some State programs only regulate the construction stage of new waste disposal facilities. They do not control the actual discharges.

Therefore, while State programs exist, it will do little good to discuss them in their present form. More important, there has been no uniformity of approach or consistency in enforcement. This will soon change.

There is a general area of Federal-State involvement which deserves some attention at this time primarily because the States have served to promote the Federal policy of clean water. The Water Quality Act of 1965 which was itself an amendment to the Federal Water Pollution Control Act of 1956, authorized States, after public hearings, to establish water quality standards. These standards are outer limits of permissible pollution for each interstate waterway within the State's jurisdiction.

Once the State conceives the standards, they are submitted to the Federal Government. The Federal Government must approve the State's standards before they go into effect. Once in effect they are enforceable by both the State and the Federal Governments.

I shall discuss this aspect at greater length later when discussing past Federal programs. I now propose to move into the area of Federal water pollution legislation and examine the whole history of Federal effort in this field.

The Federal Government's involvement in water pollution control is derived from the commerce clause in the United States Constitution. Congress exercises jurisdiction over those waters, whether interstate or intrastate, capable of use as highways of interstate and foreign commerce. Congress has determined, as a matter of policy, the extent to which the jurisdiction would be applied in various aspects of water resource management.

Section 13 of the River and Harbor Act of 1899, known as the Refuse Act, is where it may have all begun. The Act prohibits discharges, into navigable waters, of refuse other than liquid waste flowing from the streets and sewers without a permit, or in violation of the conditions of a permit. Section 13 of the Act was in fact a codification of previous acts of 1890 and 1894 which were applied to New York Harbor by enactments of 1886 and 1888. The Refuse Act was administered for many years by the Secretary of the Army, acting through the Chief of Engineers, primarily in the interest of navigation. In more recent years, it has been held by the courts, not to be limited to refuse matter which impedes or obstructs navigation, and it has been applied increasingly, since 1970, as a water pollution abatement tool.

Other applicable laws in this field include: the Public Health Service Act of 1912 (9) which authorized investigation of water pollution related to disease and impairments of man. (It is important to note here that early efforts at pollution control were conceived of as solely a public health problem. These efforts were carried on by State Health Departments).

These functions have been transferred to the Environmental Protection Agency from the Public Health Service within the Department of Health Education and Welfare because of a shift in emphasis related to total environmental protection. The Oil Pollution Act of 1924 (10) was designed to include all oil discharges from vessels into coastal waters. In 1966, its coverage was extended to inland navigable waters. The Water Quality Improvement Act of 1970 repealed the 1924 Act and added new and strengthened provisions for the control of oil pollution to the basic Federal Water Pollution Control Act.

As a result of this Act, the Environmental Protection Agency is now responsible for enforcement activities related to violations on all inland navigable waters of regulations on harmful discharges of oil, and the prevention of discharge from onshore and offshore facilities, except that assigned to the Coast Guard.

It was not until 1948, however, that Congress gave statutory definition to the Federal role and responsibility in water pollution control with passage of Public Law 845, 80th Congress. This authorized a five-year program. It was extended for another three years by Public Law 579, 82nd Congress, to June 30, 1956.

The Water Pollution Control Act became a permanent law on July 9, 1956, with the signing of Public Law 660, 84th Congress. The Act was been strengthened by the Federal Water Pollution Control Act Amendments of 1961, which among other provisions extended the Federal enforcement authority to navigable as well as interstate waters; the Water Quality Act of 1965, which created the Federal Water Pollution Control Administration (now part of EPA) and authorized the establishment of water quality standards for the Nation's interstate waters; and the Clean Water Restoration Act of 1966, which authorized a vastly increased level of Federal assistance for municipal waste treatment facilities.

The present Federal regulatory measures for water pollution abatement are derived from either the basic Federal Water Pollution Control Act or the Refuse Act. Together, these provide a variety of tools to the regulatory agency. Each tool has its advantages and each has been utilized. The basic Federal Water Pollution Act, amended again in 1970 by the Water Quality

Improvement Act, has been strengthened in important respects. It is now a more complex statute. Section 10 provides for the abatement of pollution of interstate or navigable waters which endangers the health or welfare of persons and for the abatement of pollution which lowers the quality of interstate waters below the water quality standards established for those waters under the 1965 amendments. To date, 46 states have had their water quality standards approved in total by the Federal Government. The remaining states have all received partial approval. Exceptions to the approval, deal with specific water use criteria, implementation plan dates, and non-degradation language.

One of the clear defects of water quality standards was their application only to interstate waters. Such waters comprise about 14 percent of Nation's waters, the remaining 86 percent being wholly interstate. EPA studies indicate that some interstate waters may in fact not be covered. In this regard the law had an extremely short arm.

I shall briefly outline the enforcement mechanism in Section 10. It utilized a three step procedure: 1) a non-adversary conference of Federal, State, and interstate water quality agency representatives; 2) a public hearing; and 3) court action. Proceedings in 57 cases have been held under this authority. Abatement of violations under Section 10 can be obtained through direct court action. However, if the violation has solely an intrastate effect, the Governor of the State in question must give his consent to the bringing of the suit.

As you can see, the basic law which I have described, having been modified so many times, became extremely complex and its enforcement

procedures contained too much delay. In comparison, you need only look at the procedures just described and what was accomplished in one paragraph of the Refuse Act, which in essence says: a) it shall not be lawful to throw, discharge, or deposit any refuse matter of any kind or description whatever, into any navigable water in the United States or any tributary of any navigable water of the United States; and b) the Secretary of the Army, acting on the advice of the Corps of Engineers, may issue permits for such deposits, with a limited duration and under conditions to be prescribed by him. The Refuse Act regulates industrial discharges to all navigable water of the U.S., whether interstate or intrastate, and tributaries to such navigable waters.

The major change in this Act came not through legislative modifications but from two Supreme Court decisions in the 1960's which said that the Act serves anti-pollution as well as navigation goals (11). The Refuse Act is backed up by fines, imprisonment up to a year and, most significantly, by the equity power of a Federal Court to enjoin violations of the Act. It is felt that the civil remedy is generally more effective in preventing future pollution. Criminal prosecution under the Act is generally not recommended except in cases of isolated or instantaneous discharge resulting in serious damage.

Since December, 1970, EPA has recommended 265 civil and criminal cases to the Department of Justice for prosecution under the Refuse Act.

The 1899 Act is a useful instrument where intrastate effects of pollution cannot be shown. As opposed to the procedures under Section 10, there is no need to distinguish between polluters violating ambient water quality standards. Under the Refuse Act, the Federal Government can react promptly and directly against dischargers

I would like to return now to the program with which I am most familiar, the Refuse Act Permit Program. In the late summer of 1970, the need for a coordinated Federal program became clear to all. The Department of Interior announced it would utilize the Refuse Act for all types of discharges not adequately covered by Federal-State standards; the Justice Department issued guidelines to U.S. attorneys on when to bring Refuse Act prosecutions; and the Army announced it would like to initiate a Refuse Act Permit Program. Such a program would have to be well grounded legally, relate the Refuse Act permits with water quality standards in the manner contemplated in Section 21(b) of the Federal Water Pollution Control Act, make the greatest impact on our National water quality problems consonant with the nature of the limits of Federal authority, and address the problem of applying the program to existing discharges without creating crippling uncertainty and delays.

When both Houses of Congress failed to take any action on the Administration's proposal to fill out the gaps in Federal authority, it was realized that any action on the Refuse Act Permit Program would have to start with admittedly deficient Federal water quality legislation. It was concluded, however, that even without specific improvements, there were very considerable benefits that could be achieved by drawing together all our existing water quality authorities into one coherent permit program, and commencing the program before another year of debate slipped past.

The combination of this effort was Executive Order 11574 signed on December 23, 1970, by the President. Thus was initiated the Refuse Act Permit Program.



Unfortunately, all sources of pollution were not covered by the program. Some felt that even sporadic criminal prosecution under the Act was a more potent enforcement tool than a systematic plan of permits, to bring dischargers up to the mark. Others felt that the States' permit programs had not eliminated pollution, so why should this one. However, the Federal permit program did not duplicate regulatory activity already existing in most States. The Refuse Act Permit Program was more comprehensive and more demanding.

While second year progress was impeded by unexpected events in the courtroom, I would like to review definite successes enjoyed by our Office. The Office received a total of 19,549 applications (Part A's) which were due by July 1, 1971. Of these, 15,356 were from "critical" industries--those filing within 20 specifically identified industrial categories.

EPA and the Corps have been working together since July to bring into compliance everyone who is covered by the Permit Program. EPA has been concerned primarily with identifying and bringing into compliance the major industrial dischargers in the country. Our regional offices were instructed to identify major industrial dischargers in their regions. Approximately 3,000 major dischargers were identified in a nationwide survey. A determination was made of those who had not filed. On-site inspection of those companies was made to confirm the existence of a discharge subject to the program. A sizeable number of companies, initially identified as major dischargers, were identified as not subject to the Permit Program's jurisdiction. Approximately 35 companies were referred to the Justice Department for prosecution under the Refuse Act, for not filing. We are now confident that virtually

every major industrial discharger in the country, covered by the program, has a permit application on file.

We now believe that in excess of the 90% of the total pollution caused by all industries in the country is covered by applications on file with the Corps. It is significant to note that over 1,000 applications, mostly from relatively small plants, were received in the month following EPA's announcement of the 35 cases involving non-filers. Since a large percentage of the applications that have been filed, have been incomplete, both the Corps and EPA have spent a great deal of time obtaining additional information. While this has slowed the task of evaluating the applications, nevertheless we have been going forward with a number of activities related to the task of deciding what permits should be issued and under what conditions.

Seminars designed to evaluate representative permit applications submitted by the most important industrial categories, have been conducted. The objective of these seminars is to gain as much uniform material as possible in writing permit provisions and conditions within particular industrial categories, and to provide the maximum degree of guidance possible, on a national basis, to the regional EPA personnel who must evaluate the applications.

We have also been developing a form for reporting self-monitored discharges pursuant to conditions set forth in permits and a manual to assist in establishing a self-monitoring system.

I would like to list some of the positive results flowing from the Permit Program. Industries not previously aware of the exact nature or extent of their discharge have been required to examine and report in

the permit application much information not previously known. In reviewing plant processes, company officials frequently locate previously unknown outfalls and sewer connections. Laboratory analyses often show that many systems are not operating as effectively as was believed. As a result of the Permit Program, many companies have voluntarily taken corrective measures to reduce or eliminate discharges prior to the imposition of a specific permit requirement.

Perhaps most importantly, the Permit Program has already changed the attitude of industry and the public regarding the public's right to know the complete facts of what industries are discharging into public waterways. As further data is accumulated and analyzed, we will obtain a much better understanding of the nature and extent of industrial pollution in individual waterways throughout the land.

No examination of governmental regulatory efforts to end water pollution would be complete without a survey of the events of the past year. During this period of time the program experienced crippling blows and exhilarating triumphs.

The new year opened on an extremely low note. In late December of 1971, in the decision Kalur and Large vs. Resor, the U.S. District Court for the District of Columbia issued an injunction preventing the Corps of Engineers from granting any further permits for the discharge of waste materials into the non-navigable waters of this Country (12). The suit was brought to two canoeists who contended that the Corps lacked the jurisdiction to permit discharges into tributaries of navigable waters and that it had failed to file the necessary environmental impact statements when it granted the discharge permits. The court upheld both contentions.

So, the Permit Program which had granted, to that point in time approximately 20 permits, was in a situation in which it had on hand approximately 20,000 applications for permits and it was without power to grant any. In the face of this judicial decree, the program decided to process the applications as if nothing else had taken place, and to await what it had hoped would be prompt relief in the form of permission to grant permits in the courts or in the Congress.

At this same time there was before Congress a legislative proposal called the Federal Water Pollution Control Act Amendments of 1971. The Senate had passed its version of these amendments, S. 2770, on November 2, 1971. The House did not pass its version, H.R. 11896, until March 29, 1972. Both versions, though containing some radically different provisions, did contain hope for refloating the Permit Program.

Congress commenced a conference on May 11, 1972, to seek some compromise in the various differences between the two versions. It took Congress thirty-nine conference sessions before it could bring before both Houses of Congress a Conference Report. This report was issued in the closing days of the second session of Congress and passed both Houses of Congress on October 4.

It became law on Wednesday, October 19. I can personally attest to a sense of euphoria and exhilaration which I and all persons within the permit program experienced upon hearing this news.

The bill as passed by Congress does more than merely lift the constraints handed down by the Kalur decision. It changes the emphasis of anti-pollution programs and impresses a new philosophy on the Program. Whereas in the past there have been considerable declarations that prime responsibility for clean

up was in the States' hands, this Congress constructed a program whereby the States could assume authority for processing and granting permits. It also created a system whereby the Federal Government would establish effluent limitations on top of present water quality standards. The ultimate goal is to eliminate effluent discharges.

Under effluent limitations all industries, discharging into U.S. waters are required to apply by July 1, 1977, the "best practicable treatment technology currently available." By July 1, 1983, they will be required to install "best available technology economically achievable" at the time. The bill also sets a deadline of July 1, 1977, for cities to install secondary sewage treatment facilities.

Some key changes in definitions exist in the new bill. The jurisdiction of the Permit Program has been widened and takes into consideration all waters of the U.S., including what we labeled tributaries under the 1899 law, contiguous zones and the oceans. The term discharge has been redefined to include directly both industrial and municipal point sources. Indirectly, industrial discharges into publicly-owned treatment works will be controlled but not by permits.

To avoid the heavy burden placed upon the Program by the Kalur decision, Congress exempted the Administrator from the duty to file environmental impact statements. It stated that none of his actions could be deemed major Federal actions with significant effects on the environment, except in two cases. One is pertinent for our purposes. Any application for a discharge from a new source will be considered a major Federal action and will require an environmental impact statement to be filed with the permit.

Allow me to briefly outline the new industrial discharge permit program to be administered by EPA. Permits already granted under the 1899 Refuse Act will be considered valid under the new program, but the Refuse Act program gradually will be phased out. Under the compromise, the EPA Administrator is directed to establish guidelines for the States to operate their permit programs. Each State program must be approved by EPA, and, pending that approval, EPA will issue permits. After the guidelines have been promulgated and the State program is approved, EPA no longer will retain the permit-by-permit veto power except under two conditions: Where a State permit does not conform to the guidelines; or where the Governor of a downstream State determines that his States' waters are being polluted by the discharge allowed under the permit. EPA will monitor State programs closely.

One further note, EPA will issue the new permit to the applicant. The Corps of Engineers no longer has the duty of receiving the application, submitting it to EPA for review and advice, and then finally issuing or denying a permit. Under the present legislation, EPA will submit an application to the Corps of Engineers for its review and advice upon whether the proposed discharge will impede navigation.

A critical area in any Permit Program and regulatory activity is enforceability. Despite Federal approval of the State proposal to operate a Permit Program, both Federal and State Governments have equal opportunity to enforce this Act. However, the Federal Government will allow the state government a reasonable period of time to pursue any violation. Should the state falter, the Federal Government will pursue the matter. This may lead to Federal suspension of the State Permit Program and reassumption of the permit Program.

I return then to my earlier statement that pollution occurs when materials accumulate where they are not wanted; that a pollutant may be a valuable resource out of place.

A recent article in the Washington Post on the dumping of wastes at sea, specifically in the New York Bight, stated that the following metals were discovered in the sewage sludge: chromium, copper, lead, nickel, zinc, and even silver. Obviously, these metals should be recovered since they are becoming increasingly scarce.

I feel, therefore, that instead of looking upon antipollution laws as total constraints to natural resource development, we should look upon them increasingly as measures designed to produce a more efficient and effective use of our resources.

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## THE NEW MONTANA STATE CONSTITUTION

by John Toole  
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Missoula

I consider it a privilege to be here to talk to you on this subject. I guess we have a new constitution.

Every morning when I get up, I look at the paper and wonder what group has taken action against us in the courts again. We never know, but its been quiet now for a month and I suspect that maybe its over. At least we are assuming that. The Legislature will be convening shortly and it appears that if anyone is going to take any action, the time has passed.

The sheet that is being passed out to you is Article 9 of your new Constitution entitled: "Environment and Natural Resources." It's been hailed by some as the strongest environmental article in any state constitution. It has been condemned by others as weak, timid and conservative. Whatever it is, its different than any other state constitution.

Montana is the first of the eleven western states to adopt a new constitution since the admission to the Union. It is one of only ten of the states in 27 years to adopt a new constitution. Constitutional modification in the United States at the state level has been very difficult. Many of our neighbors have tried and failed--North Dakota has failed, New Mexico failed, Idaho failed.

Montana is the only western state with an environmental article. Some of the states have a natural resource article which is mainly oriented toward resource development and not environmental protection. Of course, there is nothing in the U.S. Constitution about the environment and obviously nothing was necessary since the vast compendium of federal legislation has been held to be constitutional on matters of environment.

The pressure in Montana for an environmental provision in our new Constitution was strong. Every delegate campaigned on the basis of putting an article into the Constitution. So we were all prepared to do something when we got over there.

But the problem of the wording of the article, became immediately very sticky. Constitutional provisions are not like legislative statutes, which can be changed from year to year. They are in there for a generation and can only be changed by the cumbersome process of amendments. We have few precedents to go by. Illinois adopted a new constitution in 1970 which has a strong environmental article in it. North Dakota had a strong environmental article but its constitution was defeated. Idaho completely avoided the environmental issue in their constitution and their constitution was defeated. We got into a terrible problem with semantics in terms of putting this kind of language into the constitution; such words as clean, healthful, enhance. Do such words have a place in a constitution? Many constitutional purists think not. For example, if you enhance--a word that is defined as increasing, augmenting, tightening or intensifying--without also using the words clean and healthful, would it simply mean that you were intensifying or worsening of an already bad environment such as the polluted Missoula valley?

The original committee report simply used the words, maintain and enhance the environment. On the convention floor the words clean and healthful were put back in the article. The Committee Vice-chairman resisted the use of these words by saying that a polluter could, "parade in some doctors who would say that a person with four pounds of arsenic in his lungs and wasn't dead lived in a healthy environment." In other words, healthful in his view was a limiting, rather than an expanding concept in constitutional language. This is the kind of battering back and forth that we got into on wording.

Personally, the words clean and healthful do not bother me, I think the courts will pioneer in interpreting them as they have other words for 200 years.

Let us look at Section 1. It is a strong statement of principle. It is short, as constitutional provisions should be. Subsections 2 and 3 mandate the legislature to implement Section 1. Its critics maintain that that's all it is. A statement of principle. "It sounds good, but don't say much." They maintain that as a practical matter there is no way to mandate the legislature to do anything. If the legislature decides to sit on their hands, no power on God's green earth can make them act.

This I do not believe to be entirely true. Failure to implement a constitutional mandate can be brought forcibly to the attention of the voters and this is the power that ultimately influences legislatures. There is no question that the legislature could drag its feet on this article, however, or pass innocuous legislation not conforming to the spirit of the article and then go home and point with pride. It was an entirely different constitutional concept which was supported by environmentalist lobbyists in the

convention. This different concept was also the plan of Mrs. Louise Cross, the chairman of the Natural Resources and Environment Committee. I felt very sorry for Mrs. Cross. She was unable to muster even enough support in her committee for a minority report. Only one other member would go with her and she had to have three to get a minority report. Mrs. Cross and environmentalist groups wanted a concept known as the public trust, along with the citizen's right to sue. Now the public trust is not, so far as I know, incorporated in any state constitution. Here is the wording of the public trust as introduced on the convention floor. It would have eliminated Section 1, Subsection 1. "The State of Montana shall maintain and enhance a clean and healthful environment as a public trust. The sole beneficiary of the trust, shall be the citizens of Montana who shall have the duty to maintain and enhance the trust and the right to enforce it by appropriate proceedings against the trustees."

This proposal would not permit citizen suits against polluting corporations or individuals, but only against agencies of the state such as the State Board of Health. The proposal met instantaneous opposition from land owners large and small and from resource based industries. It was viewed as a direct threat to private property. It was called a fundamental change in our body of law.

Its proponents pointed out that the use of private property is never absolute, and that the public trust doctrine has existed in Europe for centuries. I believe the latter to be true. In western Europe there is not very much publicly owned land, it is by large privately owned land. This is true certainly in Scotland, eastern France, and in Bavaria. This land, most of

which are timber lands, at least the ones that I have visited, are owned privately. They are operated and administered under the public trust concept. It seems to work well. I don't know if it would work in this country, but it has been working there for many years.

The convention defeated the public trust proposal 58 to 34. The next environmental provision that was introduced and defeated was a proposal by Mae Nan Robinson of Missoula which permitted citizen suits. It reads: "The public policy of Montana is to achieve and maintain a high quality environment which is clean, healthful and pleasant for the protection and enjoyment of its people and the protection of its natural beauty including wildlife and vegetation. Each person shall have a right to high quality environment which is clean, healthful and pleasant; and the duty is to act in accordance with this public policy. Each person may enforce such right against any party, governmental or private through appropriate legal proceedings, subject to reasonable limitations and regulations as provided by law."

This would permit citizens suits even though a citizen was not damaged. It differs from the class actions now being brought in Montana, in that all the persons in present class actions, have allegedly suffered damage. It is similar to the provision in the Illinois Constitution; also the North Dakota Constitution, which was defeated, contained this proposal. Once again on this one, we got into semantics; how to put in such words as pleasant, high-quality and enjoyment in constitutional language, so that we wouldn't be establishing for generations to come a concept that was not the intent of the Convention or the people.

The broad concept of citizen suits frightened the convention and apparently the state. It was defeated 51 to 43. I think it should be noted here that the citizen suit concept in this proposed article is "subject to reasonable limitation or regulation as provided by law," so that the legislature can build some fences around citizen suits to minimize frivolous and irresponsible actions.

The proponents also cited the difficulty of bringing citizen suits, the heavy bonding requirements--you can't sit down and hit industry with an injunction without putting up a very substantial bond--most citizens would not be in a position to put up a bond of that nature. Attorney fees, costs of depositions, travel, all make it difficult for a citizen to bring this suit. In Illinois, since July 1, of 1970, 18 cases have been brought by citizens, 84 by government agencies. In Michigan which has a statutory provision for citizen suit, 35 cases have been filed since July 1 of 1970, and most of these by the State of Michigan. It should be noted that these are states with large populations and severe pollution problems.

Passing on now to Section 2, Reclamation. It reads, "All lands disturbed by the taking of natural resources shall be reclaimed." When it came out of committee it read as follows: "All land disturbed by the taking of natural resources shall be reclaimed to as good a condition or use as prior to the disturbance."

We immediately foundered on this because the question was brought up; how do you restore the Berkeley Pit in Butte to as good a condition as it was prior to disturbance? What do you do to the gravel pits along the highways that have been used to gravel the highway? How do you obliterate and restore

logging roads that have been built to harvest timber? We eliminated words, "reclaimed to as good as prior to the disturbance," and just left it, "All land shall be reclaimed." This is probably a statutory provision. It is probable that the legislature now has all the power it needs to enact legislation with respect to reclamation.

The legislature has acted in this area in 1971 and I am sure that it will continue to act in this area in the coming sessions. However, because of the current concern and uproar over the strip mining in eastern Montana it was felt that the convention should address itself to this problem. And, of course, this is a legislative mandate for whatever that's worth.

Section 3 is on water rights, and I have no expertise on this subject. Fortunately, Mr. Bronn is here and if I get into trouble, I'll call on him to bail me out. However, I will go through it with you and try to give you the sense of the convention in this section. Section 1 is self-explanatory. It was put in there to allay the fears of many people, particularly in agriculture, with respect to their existing water rights and I think was absolutely necessary to be done.

Section 2 is taken verbatim from the old constitution and was taken in order to preserve the substantial body of law and court decisions that have grown up around this section.

Section 3 is an important section in the opinion of the attorneys. This section which claims for the people of Montana all surface, underground flood and atmospheric water. This section will be useful and important to us in possible upcoming litigation with the federal government or with other states, in which we constitutionally lay claim to the water for the people of Montana.

This section, of course, is a public trust and attorneys advised me that it would be very important in litigation with the federal government over Montana water and with other states because of the full faith and credit clause in the U.S. Constitution in which one state must give full faith and credit to the laws of another state.

The Committee Report on Section 3 was broader than this. It defined the beneficial use of water and included the following as beneficial uses: recreation, scenic waterways, wildlife habitat, and future beneficial uses as determined by the legislature or by the courts. These uses would not require a stream diversion. Delegates supporting this provision thought such use should be defined in the Constitution, wanted it strong, so that these uses would be constitutionally protected. Those opposed to this provision, said it could be done by legislation and it was statutory, that the legislature now has the power to define beneficial uses of water and include recreation, etc., if they so desire. These were lengthy technical debates. There was an amendment to make these rights junior to irrigation. And then we realized that if the state of North Dakota should claim some Montana water for irrigation and we had made recreation junior to irrigation, that North Dakota would say that you made recreation junior to irrigation so you can't have the water and it got extremely involved and frequently I felt I was casting uninformed votes.

Section 4 was passed almost without debate. Water rights records are now in the County Courthouses. They're in bad shape. Many people don't know what the exact status of their water right is, they're kept in shoe boxes, improperly filed, and there was an unanimous feeling that a centralized record



system should be established in Helena in addition to the system of local records and the whole housekeeping business of water rights should be spruced up.

I will not address myself to Section 4 since it does not pertain to the subject we are discussing today. It is a statement of principle and another mandate to the legislature.

Before we leave the article on environment and natural resources, however, I would like to tell you that we became so enamored "of clean and healthful" that we also put it in the Bill of Rights. So there is a provision in the Bill of Rights in which every citizen is entitled to a clean and healthful environment. However, the presence of that in the Bill of Rights should not be construed as the right of citizen to sue, unless of course damaged.

Now, you will notice that through the entire constitution and throughout this article we have posed great confidence, great trust and great responsibility on the legislature. Therefore, it seems to be appropriate for me to comment briefly on the legislature article because it is the legislative article which is the most important article in the Constitution in my opinion, and it is the legislature that is going to have to implement this article the rest of the constitution.

In the legislative article we brought profound change. The new legislature meets annually. It meets on the basis of legislative days instead of calendar days. In other words, we can recess and go home. It can call itself into special sessions. Its members would be elected from single member districts so you would not have twenty-four people on the ballot, most of

whom are unknown to you from which you must choose eight or twelve representatives or senators. We have provided for a reapportionment commission to reapportion the state after each census so that the problem of the legislature would be rid of trying to reapportion itself which has been such a headache to them. It is almost impossible for a legislature to reapportion itself. They are now relieved of this. The reapportionment commission has the force of law. And while the legislature can advise it, the decision of the reapportionment commission is final. This I think will relieve them of a great problem.

Bills may carry over from one year to the next. With ability to adjourn on the first of April of this year, the status of the bills that are in the hopper at that time will remain the same on the first of January of 1974.

We established a salary commission, which will recommend salaries for the legislature and for the state officials. We recognized the problem the legislature has had with setting adequate salaries for itself. We hope this salary commission will take a little of the onus off them in that area. In other words we tried to bring the legislature into the Twentieth century. This in no way implies any criticism of the old legislature. But the sixty-day biannual session was limited to calendar days and they were literally overwhelmed. They did a wonderful job considering the machinery they had to work with.

Now the objections to the legislative article are that they will go over there and sit and just make mischief and pass a lot of bad laws and draw high salaries. The second objection is that it's going to cost a lot more. Well, it certainly is going to cost more. Annual sessions are going

to cost more. Longer sessions are going to cost more. Salaries may go up. However, at this moment, the legislature of the State of Montana is taking less than 1% of the state's budget to operate. If you are going to spend money any place, it seems to me in government, you had better spend it on that arm of government which is the most important, and that is the legislature, that arm of government which represents the people; the arm of government which produces the laws, rules and regulations by which we live. If there is any place we should be spending money, it's in improving the machinery and the quality of that body. So I am perfectly willing to pay more to modernize the legislature and give it an opportunity to function as it was unable to function under the 1889 constitution.

We live in a democratic society. It may fail. I've heard a lot of people say that it isn't going to survive. That's possibly true. Maybe it won't. But it will surely fail if we don't give the institution by which we govern ourselves the machinery to operate effectively. Under the 1889 constitution, the legislature could not operate effectively. If we are going to insure the failure of our system, it's to hobble the legislature the way it was hobbled in the 1889 constitution. We've turned them loose and maybe they will go over there and make mischief. I don't know. At least this is the system we've got and we better provide all the machinery that we can to make it work. That's basically our philosophy in the legislative article and it has a direct bearing on the environmental problem, and that's why I mentioned it.

In conclusion, I would like to admonish our critics of the convention who say that we were too conservative, too timid in the environmental article.

The constitution passed by 2,537 votes out of 230,000 cast. When you think about it, you realize that we pushed our luck to the limit in the convention. Had we passed the public trust, the constitution would have failed. Had we passed citizen's suits it would have failed. Had we passed the reclamation of land to its original condition, it would have failed. I think it would have failed had we established recreation as a beneficial use of water. Desirable as it may be.

The article on Natural Resources and Environment was generally accepted by the people of Montana as being a simple one. We had no trouble in ratification here today with this article. The troubles we had were with the articles on revenue and finance and education. We have in my opinion a relatively strong article. Had we pushed it one word further we would have had nothing. And considering the profound reforms running through the document, I think this would have been a tragedy.

## OUR TAX STRUCTURE

by Keith L. Colbo  
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The development of natural resources has always been a major factor in the economy of Montana. Many of our major cities were founded and have grown as a result of the forest products industry, mining, or oil production and refining. Besides contributing to the taxable income of residents of the state, resource oriented industries pay taxes based on corporate income and property ownership. Most industries also pay severance taxes based on the value or quantity of the resource they remove from the state.

The taxes considered here are mainly of the severance tax variety. They are based on some measure of production which ties the tax directly to the removal or development of the natural resources of the state. Since no severance taxes are imposed on timber in Montana, the property tax has the most direct effect on the wood products industry of western Montana.

Both state and local governments in Montana rely heavily on natural resource oriented industries for tax revenue. Although mining and the wood products industry are a smaller segment of Montana's economy than they were two decades ago, the taxes paid by these industries continue to grow. The major severance taxes on coal, metal mines, oil, and natural gas production produced slightly less than 2.7 million dollars for the state general fund

in fiscal year 1962. In 1972, these same tax sources produced almost 4.9 million dollars. This is an increase of 81 percent in tax revenue. The coal production license tax increased from \$11,000 in 1962 to more than \$483,000 in 1972 and could produce more than one million dollars annually within a few years.

Another type of severance tax, the net proceeds tax applies to all mining activities and is in lieu of property taxes on minerals in the ground. Net proceeds from mines contributed more than 90 million dollars to the property tax base of local governments in 1970 compared to fifty million dollars of taxable net proceeds in 1962. Although there are no severance taxes applied to timber in Montana, property taxes are a major source of revenue from the timber industry. The assessed value of privately owned timber land increased from 7.5 million dollars in 1962 to more than 11 million dollars in 1970.

As these statistics indicate, natural resources account for a large part of the tax base in Montana. This should not be surprising because the developers of natural resources use government services in Montana just as other taxpaying businesses and residents of the state. However, in the development of Montana's tax structure, as it relates to the state's natural resources, revenue has been the primary and, in some cases, the sole consideration. Our tax structure seems to ignore the fact that raising revenue sufficient to pay for the operation of government is only one of the functions of a tax structure. A second function, and of equally great importance in the field of natural resources is control and regulation of business activities.

The tax system can be a powerful tool to encourage socially desirable development and use of a state's natural resources. It can be used to encourage rapid development of a new industry through the use of tax incentives to stimulate business. Currently, Montana offers a tax incentive to new industries which manufacture products from resources which are inservicable in their natural state. The incentive is in the form of property tax relief for the first three years of the firm's operation. The tax system could also be used to control utilization of a scarce resource, regulate the impact of business on the environment or totally abolish an undesirable activity. Although the regulatory aspect of the tax system has been largely ignored in the past, Montana may be entering an era when government cannot afford to place primary importance on the revenue producing quality of the tax system as it applies to natural resources. Regulation of resource oriented industries will become more important in the future and the tax structure is one of the most important tools on regulation of business and private activities.

Although most of our taxes are designed solely to produce revenue, there are a few bright spots in the Montana resource tax structure. Montana is one of only a few states that does not attempt to levy property taxes on minerals in the ground. Instead, Montana's net proceeds tax, which is in lieu of the property tax, is based on the value of minerals produced and sold during the year.

While it is impossible to ascertain the motive behind the adoption of Montana's net proceeds tax on minerals, it has existed since 1889 and was made part of the original state constitution. Although many believe that the net proceeds tax is favorable to the mineral interests and was instituted

because of the power of the mining interests at the original constitutional convention, it recognized one of the more serious problems of property taxations -- namely, how to value mineral resources as property before they are extracted. Should a deposit of minerals be taxed annually as property if the owner never intends to develop a mining operation? How would we tax farm land in eastern Montana under a property tax on minerals even though land is used for agricultural purposes, large deposits of coal may be lying just a few feet under the surface of the land. Very few ranching operations in eastern Montana are profitable enough to use land for grazing purposes while paying property taxes on coal deposits. Probably the most serious problem that Montana has avoided by taxing production rather than minerals in place is the problem of finding and valuing an undeveloped mineral deposit. Present mineral technology has partially alleviated this problem in states that tax minerals in place, but it is still a matter of considerable controversy in states that tax mineral deposits as property. The net proceeds tax, used properly, can be very important in encouraging efficient and orderly development of mineral resources. Since industry must pay taxes on the value of ore extracted, it is encouraged to produce efficiently and economically. In contrast, a property tax on the value of minerals in place encourages rapid and haphazard development of a state's mineral wealth. If property taxes are paid on minerals in the ground, mining firms are encouraged to deplete the resource as quickly as possible. This is the only way to escape the cumulative burden of property taxes over a period of years. For example, suppose a mining firm has minerals in the ground on which \$1,000 per year in property taxes are paid. If this firm defers production for ten years, profits on the



sale of ore are reduced by \$10,000. By extracting all of the ore in the first year and reducing the taxable value of the property to zero, the firm can escape \$10,000 of taxes and increase profits by \$10,000. Thus, property taxes on natural resources encourage rapid exploitation of minerals in contrast to the net proceeds tax which places the tax penalty on extraction rather than on the value of unmined minerals. Our net proceeds tax works perfectly because many firms extract minerals on which no net proceeds taxes are paid. This is because allowable deductions from the value of minerals produced can, at times, reduce the taxable value to zero. This is a fault of the current law, however, not the concept of a tax on production in lieu of property taxation. Montana does have the framework for a tax that both produces revenue and can be used to sponsor planned and orderly development of the state's mineral resources. In spite of the acceptance in Montana of the concept of taxing production rather than minerals in place a tax structure designed primarily to produce revenue will contain inconsistencies. We do not approach the taxation of all depletable resources with the same logic as that applied to the mineral industry. Although timber is a depletable resource in western Montana, we persist in taxing trees as property. In fact, the taxable value of uncut timber has recently been increased in Montana to more nearly reflect the market value of privately owned timber resources. While the counties of western Montana feel that they need this property tax base, the present system of taxing timber encourages its rapid utilization. Individuals who own small tracts of timber may find that they cannot afford to preserve the timber on their land for recreational uses or its esthetic value because of the pressure of property taxation. The annual burden of property taxes on this land can only be removed by

burning or logging the timber. Once the trees are removed, the land may be reclassified as grazing land and taxed at a much lower rate.

The pressure of property taxes are also felt by commercial tree farms and timber producing firms. Commercial forests must grow fast enough to annually increase the number of board feet in a timber stand by an amount sufficient to pay property taxes and still produce a normal rate of return for the industry. When mature stands of timber fail to grow fast enough to cover taxes, the rational business man has no alternative but to log now rather than later. Each year that property taxes are paid on a mature stand of timber reduces the eventual profit from the sale of wood. Property taxes on timber encourage the rapid depletion of this resource. The tax policy in this area of resource management is in direct contradiction with the philosophy of taxation applied to the mineral industry. Mining firms are taxed on the value of resources they remove from the land, foresters are taxed on value of the trees they leave standing.

Since the 1972 constitution does not require that all classes of property be subject to property taxation, it may be time to consider applying severance tax concepts to the timber resources of Montana. Other states, Washington and Oregon for example, are already implementing severance taxes on the timber resources in those states. If orderly development and conservation of timber resources are viable goals in the area of resource management, it would be possible to tax timber producers on the value of the trees they cut down rather than on the value of the trees they leave standing. If clear cutting should be discouraged in Montana the tax system could provide tax incentives for firms which avoid clear cutting operations or tax penalties for those that engage in clear cutting. Re-seeding could be encouraged by taxing fallow

land or granting tax rebates to help defer the costs of re-seeding operations. The options are many, but socially desirable goals with respect to the management of both public and privately owned forest land must first be established.

Once goals for resource management are established the tax system may be used as a tool to help reach these goals.

The net proceeds and property taxes on resource industries are primarily local government sources of revenue. Any anticipated changes in the tax structure which would emphasize control and regulation at the expense of the revenue producing function of the tax system would have to contain provisions that insure continued support of local government. The 1972 constitution provides much more flexibility to the state-local tax structure of the state by making much more state aid available to counties and cities. With adequate use of state aid to local governments, localities would be able to more fully utilize the regulatory function of their tax systems. At present, the pressures on local government to provide services and their limited tax sources require that revenue production be the primary function of all local tax systems.

Most of the state taxes on resource oriented industries are of the severance tax variety. The state metal mines tax, oil production tax, coal production license tax, and natural gas tax are all based on the value, or quantity, of natural resources removed from the land. While these taxes are based on extraction, their main purpose is still to produce revenue to pay for government services. The coal production license tax is notable because it does employ some regulatory as well as revenue producing concepts. The tax on coal ranges from four cents per ton on coal rated at 6,000 BTU or less,

up to 10 cents per ton on coal that produces in excess of 9,000 BTU's. The structure was designed primarily to produce revenue since the higher grade coal sells at a higher price and can, therefore, bear a higher tax burden. \$483,000 was collected from the coal production license tax in 1972. The regulatory aspect of the coal tax encourages producers to make adequate provisions for reclaiming land disturbed by strip mining operations. Coal producers can receive a tax refund to defray part of their reclamation. Even in the area of coal, research is needed to determine whether the tax rates are high enough to have an impact on development of the coal fields of eastern Montana and whether the reclamation provisions are adequate to provide strong incentives to the industry to reclaim damaged land. More could be done in this area to encourage the coal mining and energy producing industries to meet environmental goals. For example, the current tax is highest on the best quality coal produced. This is natural for a revenue producing tax, but it may not be the proper structure for a regulatory tax system. If the state wanted to encourage the development and use of the highest quality, low pollution coal, it would seem that the tax should be low on high quality coal. Low quality, high sulphur coal should bear the highest tax if its use is to be discouraged. To the extent that coal mined in Montana is to be burned in energy producing plants in the state, it would seem that the tax system should be used to encourage the use of the highest quality, least polluting coal available. The current tax based on BTU content is not modified for the sulphur content of coal. Perhaps the tax structure should be modified to place a penalty on firms producing and using high sulphur, low BTU coal.

Montana's other resource oriented taxes such as the oil production tax and the metal mines tax are not designed to regulate the industries concerned. Fortunately, they do not encourage exploitation, but neither do they discourage it. These taxes are designed specifically to produce revenue and they work well in this respect although they have a slight regulatory effect.

The state metal mines tax is based on the value of metals extracted during the production year and the tax rate is graduated from .15 percent of the first \$100,000 of production to 1.438 percent of production exceeding \$500,000. Thus, the tax becomes heavier as more and more minerals are extracted during the taxable year. This tax, undoubtedly, has some effect on the industry. It encourages efficient development of resources at the lowest possible cost and it discourages over production in any particular year. Collections from the metal mines tax have been reasonably stable over the past decade. It fluctuated between 750,000 and 1.2 million dollars between 1960 and 1969. The tax rates were increased in 1969 and the tax should bring in between 1.5 and 2.5 million dollars for the next few years. This indicates that production is remaining relatively constant in Montana. While this is probably partly due to market conditions the metal mines severance tax does have an effect in sponsoring the orderly development of the mineral resources of Silver Bow County.

The oil production tax is also slightly graduated to place a higher burden on excessive production during the taxable year. The oil production tax produced more than 2.6 million dollars in 1972. Revenue from this source fluctuates considerably depending on the discovery and development of oil reserves in the state. It is unlikely that the oil production tax has much of a

stabilizing influence on production in the state of Montana.

One other point should be made regarding state taxes on natural resource development. While all of the state taxes are severance taxes based on production, the proceeds of all of these taxes goes to the state general fund. The coal production license tax is the only state or local resource oriented tax in Montana where part of the revenue is used directly to alleviate the impact of the industry on the environment. This is in the form of tax rebates to coal firms for reclamation discussed earlier. It would seem that those of you who are concerned about the development of natural resources have a stake in both sides of the state's tax structure. First, in establishing goals for resource development so that the tax system may be used to arrive at these goals. And second, in establishing priorities for the use of tax revenue derived from resource-oriented industries. In 1972 the state collected more than 4.6 million dollars from resource development industries. This does not include net proceeds taxes or other property taxes such as those on the timber industry. Yet, none of this money was used for environmental purposes except as it was appropriated from the general fund by the legislature.

If the tax system in Montana is to be used as a tool to encourage orderly development, the impetus for change will not come from tax agencies or those whose main concern must be with financing government services. Those interested in preserving natural resources and insuring growth without exploitation must determine reasonable goals to be met by industry and government or the tax system cannot be used properly to regulate business and individual behavior. Once goals are established with respect to the development of natural resources in the state, the tax system can become one of the most powerful methods of insuring that these goals are met.

## TRANSPORTATION IMPACT

by Charles H. Rust  
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It has been demonstrated that in Montana, transportation costs for grain equals about 30% of its value, for lumber between 20-25%, and for livestock somewhere between 6-8%. This constitutes a significant charge for marketing some of Montana's key commodities.

As we look at transportation, we should ask, "Is transportation indeed unique? Do we have unique transportation problems in Montana?" In the hearings before the Subcommittee on Transportation and Aeronautics of the Committee on Interstate and Foreign Commerce of the House of Representatives which were held earlier this year is some testimony on why transportation is unique.

On page 1442 they have this to say, "What is there about transportation that causes a demand for government regulation of it in the first place? What is so inherent in its nature that gives rise to a concern for who controls transportation?"

"Roger MacVeagh expresses it precisely, by stating, 'Transportation and communication are of paramount importance to modern society. Their control --for they are essentially inseparable being but two forms of one function,

and necessarily involved in every aspect of human intercourse--carries with it the control of the civilized world.'"

"Commissioner Kenneth H. Kugel, Interstate Commerce Commission, recently stated, 'If you were to ask me which is the most important of the public utilities: electricity? telephone service? or gas? I would have to say none of these. It is transportation . . . It undergirds the entire economy.'"

"Even carrier representatives recognize the uniqueness of transportation. 'Transportation,' states Giles Morrow, General Council and Secretary of the United States Freight Company, 'is an essential business which if not provided by private enterprise must be provided by government.'"

"William A. Bresnahan, President of the American Trucking Association, Inc., cautions, 'Another generality which only serves to confuse transportation issues is the oft-repeated and unelaborated assertion that 'transportation should be allowed to function and compete just like any other business.'"

A member of the President's Council of Economic Advisors, Dr. Hendrick S. Houthakker say, "The transportation industries are a vital part of our economy, and what happens to them is important to our overall economic performance."<sup>1</sup> This then does provide us something about the uniqueness of transportation.

It has been said that Times Square in New York City is one of the cross-roads of the world and that the people who congregate there can find almost every imaginable type of merchandise, service and transportation. To the New York resident this is pretty much an abstract concern for he only needs to go a few blocks to get anything he wants. However, in the rural areas of the nation, particularly in Montana, where people can live 7-1100 miles from

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<sup>1</sup> "Part 4 Transportation Act of 1972," Hearings before the Subcommittee on Transportation and Aeronautics of the Committee on Interstate and Foreign Commerce House of Representatives, 92nd Congress on HR 11824, HR 11826, and HR 11207.



major population and market centers such as Minneapolis and St. Paul to the east, or Seattle and Portland to the west, a person can stand on a street corner somewhere in Eastern Montana and see very little traffic at all; and much of what he does see will be heading away toward the population centers or to the time squares of the nation. In addition he will have difficulty in purchasing some types of merchandise and service.

Our commerce in Montana is agriculturally based and, as such, we deal in bulk cargoes of beef, barley, cattle, hogs, wood products, minerals or oil products that are suited for long distance transport.

Transportation, is one of the vital problems to be solved by those who are concerned with economic growth. If we improve our transport system, we can improve on our economic system. And then we likely can sustain a population and reduce the number of people we export to the cities in the U.S.

Latest information suggests that about 65% of Montana's out-of-state cattle shipments are made by truck. An average shipment is slightly over 700 miles with an average number of about 50 head per truck load. This means that between 19,000-20,000 truck loads of cattle were transported on Montana highways destined for out-of-state markets. Cattle moving out-of-state by rail generally are trucked to the rail head and probably add another 10,000 truck loads of cattle from ranch to rail head. As for intrastate shipments, these are difficult to estimate. They would include trucking to summer range, to and from markets, feed lots, and packing plants. By just doing simple arithmetic you can see the pressure this number of trucks puts on the primary and secondary road system in the state of Montana.

Our wheat production runs around 100 million bushels a year. Most of this grain is shipped out-of-state and is equivalent to nearly 30,000 railroad hopper cars that hold 300 bushel each or about 600 train loads of 50 cars each. On the other hand, it would require nearly a hundred thousand super trucks (those that can haul 1150 bushels each) to haul this same quantity.

If our barley crop is hauled by truck, it would require another additional 30,000 super trucks, depending upon the production in any given year.

#### IMPACT ON RESOURCES

Transportation has an impact upon our resources and how we can use them. Indirectly it affects us in many ways that many of us fail to recognize.

#### Transport to Land Value

Inexpensive transportation tends to increase land rents and values in remoter regions, and certainly this would relate to Montana. Without inexpensive transportation, it would be almost impossible to produce agricultural products in the state of Montana, or any other remote area. With the high costs of transportation in Montana, this does put our agricultural producers at a significant disadvantage when they are trying to compete with others that are close to market. By the same token it is difficult to develop natural resources at any great distance from the markets unless there is a source of inexpensive transportation. I think the coal development that all of you have talked about the last day and a half would not be possible without the unit railroad trains to provide a reduced cost of transportation for the coal to its consuming area.

## TRANSPORT AND PRICES

Freight rates on goods are in reality costs of production. The cheaper the transporter, of course, the lower the cost of goods and costs of assembling raw materials in the various assembly plants. If these transportation costs are lower, they in turn generally reflect lower prices for the end products for the ultimate consumers in the central cities. After all, freight rates or freight costs are a cost of production.

Two or three years ago, I was involved slightly in a project where we were trying to look at the cost of food distribution in the central cities of the East. It is very difficult to estimate the cost of distribution in the central city when you have specialized trucks going over crowded city streets with a high labor cost for drivers tied up in traffic jams and trying to move food products. This, of course, increases the cost of food products to people who live in the central city who often cannot afford the higher prices as well as those who live in the suburbs who are able to receive car lot shipments at lower transport costs. In the typical suburban setting of higher income people, they enjoy generally lower food prices from central city because the cost of delivery is considerably less into the suburbs. Transportation then gets directly involved in the pricing of goods and services. As indicated earlier, there is very little economic activity we can participate in without getting involved in transportation in some form.

## LABOR SPECIALIZATION

Geographical division of labor or territorial specialization is possible when you have an efficient low cost transportation system. It allows each

area to specialize where they have certain expertise in the labor force. One of the best examples, of course, is in international trade where it allows people who are very talented in labor intensive production to trade with the United States and in turn allows us to ship food stuffs and other bulk items, for which we have a greater comparative advantage and as a result the standard of living is elevated for both countries.

The development of the inland port at Butte is brought about largely by the geographical division of labor. To avoid the congestion at dock side in Seattle, they are able to transfer these containers from the vessel for immediate shipment to Butte where there is more room to inspect them, and move them on to their ultimate destinations.

#### LARGE SCALE PRODUCTION

Inexpensive transportation systems also allow for some of the large scale production type industries that have occurred in the United States. Whether they be good or bad in your opinion, transportation has allowed these things to develop: The concentration of the steel industry, the milling industry, the auto industry, have been largely a result of a transportation system.

#### TRANSPORT AND COMPETITION

An inexpensive transportation system or an adequate transportation system, allows more producers to sell in a given market. Without the transportation system that we have in Montana our agricultural producers would in no way be able to sell in the Minneapolis market or the Seattle market because they just couldn't afford to get their products to these markets. They are more

flexible to move either direction with the transcontinental railroads, the waterways, and other connections that they have. It also helps hold down prices of consumption goods because there are more competitors supplying the market.

#### TRANSPORTATION AND URBANIZATION

Urbanization in this country, whether it be good or bad, could not have developed without rapid transit systems. Without the multitude of freeways and other things that we have developed around the large cities, the urbanization could not have occurred with the corresponding specialization that it apparently enjoys.

#### FREIGHT RATES AND THE PUBLIC INTEREST

It has been argued that a reduced freight cost is very much in the public interest because it allows the production of goods at lower cost, which in turn means a lower purchase price to the consumer.

Each reduction in transportation charges develops more possibilities for specialization and change. When you are interested in developing your resources this may be of special interest to you.

Any increase breaks down certain geographical division of labor and certain advantages that other places may have had. As a result, if you had a significant increase in transportation charges or if your transportation was nonexistent or very high cost, then you might have developing throughout the hinterland of the U.S. many small processing plants. In other words, instead of your supermarkets being able to ship canned goods and other

things great distances from large, efficient, mechanized canneries and other processing facilities you would likely see many small processing facilities merchandising within a very small geographical area. If this is what you want, of course, you should plead for higher transportation costs.

One of the problems in the conflicts in transportation policy that has been discussed by many people is that basically we want it to be a public utility and yet operated as a private business. And this is part of the uniqueness that was referred to earlier in the hearings on transportation. This becomes increasingly difficult for a great many people to understand.

In Montana, as far as our transportation problems are concerned, we basically are reactors to it instead of actors. We have been a bit reluctant to take an aggressive attitude toward the kind of transportation system we want and the kind of transport policy we would like to have.

I have been working with an ad hoc committee that has been developing a request for a comprehensive sort of approach to transportation in Montana. This group will release shortly their recommendations for action. Hopefully it will find widespread support. An effective transport system and policy touches us all, and transport policy is of particular significance to an interior state such as Montana.

## ECONOMICS OF MONTANA

by Pat Douglas  
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I'm going to talk with you today as one who observed the Montana Economic Study in its making. First, I want to make it very clear that I am not an expert. In fact, I was not even one of the authors of the Montana Economic Study. I am here to represent Mrs. Maxine Johnson, Director of the Bureau of Business and Economic Research, and one of the prime authors of a large portion of this report. More than that, I am plagiarizing most of my remarks from her work.

The Montana Economic Study was a joint effort of a large number of people. As many of you may know, it was directed by Samuel Chase, a well-known economist who returned to his homeland for awhile; one of his important contributions during his return was completing this study.

The report consists of six volumes backed up by eleven staff papers. They are all available from the Bureau, and we urge you to take advantage of them if you have not read the report. We think the information is important to businessmen, planners, public officials and to interested citizens. It's easy to read and understand. It was written with people and not just economists in mind. This afternoon I would like to draw together some of the major conclusions in that study.

I want to talk about what has happened to Montana's Economy during the 1950's and 1960's. Then we will look at its prospects for the 1970's, particularly the latter half of the 1970's. Now the report itself took a much broader view and concerned itself with some of the socio-economic problems facing Montanans today. Some of those problems were poverty, minority groups, the Indians, environment and the effect of sparse population upon our social and cultural life. Many of the things those people said in the Montana Economic Study are not new; some of them are. But for the first time in our history, at least at this stage, the authors compiled, organized and took a systematic look at Montana's economy and the forces effecting it. That's where I'll begin today.

We are confronted with a state economy that is growing very slowly--an economy that cannot provide enough jobs for its residents and which provides its people with an average income per person well below the national average. In 1968, Montana's per capita income was 14 percent below the national average. In 1950, on the other hand, our per capita income was some 8 percent above the national average. So you see what's happened in a period of just eighteen years. (By the way, per capita income is total personal income of the state divided by the total resident population.)

Since 1950, the sluggish growth in employment in Montana has been accomplished by higher unemployment here than in the country as a whole, (we're usually about one percentage point above the national average if you take a look at the covered employment data) and an out-migration of residents.



It's not a very pretty picture: lower income; higher unemployment; an especially heavy loss of population in rural areas; small towns withering on the vine; and difficulties in providing adequate public services. I don't need to list them all for people like you.

Why is Montana's record so poor? Well, certainly not because Montanans are unwilling to work or that they do not deserve any better. We are in a fix mostly because of the nature of our industries and the change which has been occurring in the past eighteen years in our industry mix. Economists like to classify industries as primary, or export industries--that is, those which sell most of their output to other areas of the country--and as secondary or derivative employment or industry--those industries catering mostly to local markets. Well, Montana has only a few exports or primary industries: agriculture, mining, forest products and to some extent railroads, federal government and tourism. These are industries which serve markets outside the state and which provide most of the basis for our growth.

Let's take a look at what has happened to some of these individual industries. For many years, agriculture employed more Montanans than any other single industry. This was true in 1950 when almost one-fourth of the total number of people employed in Montana were at work on farms and ranches. It was not true in 1968. The MES staff estimated that between 1950 and 1968 agricultural employment in Montana declined by some 19,000 workers, and that by 1968 farm and ranch workers made up only 13 percent of the total state employment. Most of the 19,000 workers were farm operators and family workers who gave up farming and moved into the town or out of the state. Of course, Montana is not unique in this respect. Farm employment

has been declining throughout the country in many places faster than in Montana. The reason for these losses is well-known; tremendous increase in output per farm worker. New equipment and improved farming methods and the increase in output of each worker made it possible for one worker to produce about two and one-half times as much in 1968 as in 1950.

Along with agriculture, the mineral industries--mining, smelting and refining--have been, of course, a part of the backbone of Montana's economy. As in agriculture, output per worker in the mineral industries has increased and employment has declined. In 1968, there were 3,700 fewer jobs in the mineral industries than there were in 1950. For the most part, these were well paid jobs that we could not afford to lose. Increases in productivity per worker also resulted in fewer jobs in metal mining and in the smelting and refining of copper and of lead and zinc. Only the construction of the aluminum plant at Columbia Falls during the 1950's kept total employment in smelting and refining from declining during the period from 1950 to 1968.

Two major oil discoveries occurred between 1950 and 1968 in the Williston Basin in the early 1950's and in the Power River Basin in 1967. But hear this: thanks to the prolific new wells and to technological changes within the industry, 2,200 petroleum production workers in 1968 produced six times as much crude oil as did 1,200 workers in 1950. During the same work period, the amount of oil refined in the state doubled, but the number of refinery workers stayed exactly the same. So the oil industry, despite its increased production, provided only 1,000 new jobs in the state between 1950 and 1968.

Coal miners almost disappeared from the state between 1950 and 1968. They numbered less than 100 in 1968; there simply were no markets for Montana coal. Of course, this situation has changed drastically since 1968 with the

development in eastern Montana. I'll get back to that in a moment when we're looking at the prospects for 1970. In the meantime let me repeat: total employment in the mineral industries declined by some 3,700 between 1950 and 1968.

Let's go on to another industry. Manufacturing industries are also basic industries; they generally sell their products out of state. Most manufacturing in Montana is based on the processing of raw materials. I have already mentioned primary metals and oil refining activities based on our mineral resources. The other major manufacturing industries in this state are wood products industry and the food products industry. Manufacturing industries increased their employment between 1950 and 1968.

Let's take them one by one. Wood products is the state's largest manufacturing employer. Since 1950, the industry has provided some 3,500 new jobs, mostly west of the Continental Divide. The increase in lumber production and employment was mostly due to Montana's broad timber reserves. After World War II, the state contained the largest remaining unutilized reserves in the entire United States. Declining timber supplies in other parts of the country caused producers to look elsewhere; at the same time improved technology and higher post war lumber prices made it feasible to harvest Montana's steeper slopes and to use its smaller trees and seed trees such as spruce and lodgepole pine which hadn't been used before. The years since 1950 have also brought considerable diversification in the timber products industry: plywood, pulp, paper and numerous manufactured lumber products have added to the industry's output. In 1968 wood products provided 37 percent of all manufacturing jobs in this state.

The food products industry employed approximately one-fifth or 20 percent of the manufacturing industry labor force. It is a conglomeration of

small plants--meat packing plants, dairies, flour mills, sugar plants, bakeries, and soft drink bottling firms. Combined, these plants employed about the same number of people today as they did twenty years ago. Yet, the industry has seemed to offer some opportunity for growth. The rationale has been, of course, that since Montana produced large quantities of agricultural commodities, there should be some way for processing more of them here. I'll come back to that a bit later, when we talk about the prospects for 1970.

I should also mention that since 1950 we have welcomed one completely new manufacturing industry to the state. Whether or not it represents progress depends, I suppose, upon where one lives, and how one views these kinds of things. I refer to the missile assembly industry in north central Montana. In 1968, missile assembly employed about 450 people; they are among the highest paid workers in this state. These manufacturing industries and some other miscellaneous ones that I haven't spoken about collectively provided 5,600 new jobs between 1950 and 1968.

Two other industries are classified as primary industries in the Economic Study, because they are in some sense export industries. They are railroads and federal government.

Railroad employment declined drastically between 1950 and 1968 as railroads shifted from steam-powered to diesel engines, and as they automated their switch yards in an attempt to cut labor costs. The loss amounted to 7,100 high-paying jobs. Railroad towns such as Livingston, Miles City and Whitefish, and maybe Deer Lodge, felt the loss. Of course, railroad employment has been falling throughout the country, but railroads have employed consistently a larger proportion of our labor force than in some other areas of the country. Therefore, the loss hit us harder than many other states. It

is worth noting that the loss of railroad jobs has been much more severe than the loss of mining jobs--7,100 versus 3,700--even though mining has attracted more attention.

The federal government employed 4,000 more citizen workers in 1968 than in 1950. Many of these employees are concentrated in federal agencies concerned with natural resources and the management of federal land. They perform these services not just for Montanans but for the country as a whole. That's why we consider federal government as one of our export industries, though technically it isn't classified as that.

Now what do these developments add up to? They add up to a net loss of 20,300 jobs in primary industries between 1950 and 1968. The increase in employment in wood products, in other manufacturing and in federal agencies was not enough to offset the losses in agriculture, the mineral industries and railroads.

Fortunately for people who were looking for work in Montana, there was a substantial increase in the state, as well as in the nation, in what we call secondary or derivative employment. This includes jobs from industries catering mainly to local markets: wholesale or retail trades; the service industries--barber shops, laundry, hotel and motels; finance, insurance, and real estate; truck, bus, and airplane transportation; construction; and state and local government. The shift toward this kind of employment created 46,000 new jobs between 1950 and 1968. It offset the decline in primary or export employment, so that for the 1950 to 1968 period we're ahead in terms of total employment.

Because of the increase in employment in derivative jobs, we ended the eighteen-year period with approximately 26,000 more jobs in 1968 than we had in 1950. But the increase was not nearly enough to provide jobs for Montana's growing labor force. The Montana Economic Study estimated that the job gap --the difference between how many we had ready to go to work and how many we actually employed--amounted to 38,400. That is, we needed 38,400 more jobs than the state's economy provided. The result, as I mentioned earlier, was a loss of population through out-migration and many of the people who left the state were the well-educated young people.

The heavy out-migration and the shift in employment from primary to derivative industry were the principle causes of Montana's poor showing in per capita income. We lost so many people in the working-age group that we had a smaller proportion of the state's population at work in 1968 than in 1950. The workers who left had more people to support and more people to provide public services. We could have used those 38,400 additional jobs!

The shift in employment from primary to secondary industries represented, for the most part, a shift to lower-paying jobs and this had an effect, as I mentioned, on per capita income. When an area replaces jobs in railroads which paid an average of \$8,700 (already in 1950) with jobs in the service industry, where the average earnings were \$3,645 in the same year, per capita average income just has to decline. Something has to give.

The loss of agricultural jobs hurt us too; you may be surprised to hear that in Montana, average income per agricultural worker is higher than for those workers who are employed in other jobs. The opposite, of course, is true nationally. And, during the whole period from 1950 to 1968, the

oversupply of workers--those that waited around awhile before they left the state--helped keep wages and salaries down.

In short, we have an economy where new jobs are added too slowly to take care of our increase in the labor force. Further, most of the jobs are in lower-paying industries, and, as a result, per capita income is falling further behind the national average.

Now, of course, personal income statistics, as most of you are aware, are not a perfect measure of the welfare of Montana residents. There are many good things about Montana many things that are right about our state. I want to emphasize that because many of us here would be willing to sacrifice a little income for the physical and social environment which we enjoy. We probably could not be lured away very easily. For the most part we are the affluent. Things are not so rosy for many other Montanans. There is just no way that Montana's overall economic picture can be described as healthy.

It is also important to point out that the state averages can cover up very different experiences for different parts of the state. Some regional analysis was done in the Montana Economic Study. There is not time today to mention those results. In general, as you might expect, some of the urban areas here have grown and prospered while the rural areas and small towns have suffered the losses.

And now to the future. What do the 1970's hold? I do want to describe some of the predictions that were contained in the Montana Economic Study. But first I want to warn you, as Maxine Johnson would urge me to do, about those predictions. They're very tricky. They may well be quite inaccurate.

Those preparing the reports had no inside information as to what might happen during the next decade. They simply did the best they could with the kind of information that was available. Keeping that in mind, this is what they saw for the 1970's.

They expect more workers to leave Montana's farms and ranches between 1968 and 1980. They believe that more people must leave farming and ranching if farm incomes are to be maintained and if rural poverty is to be reduced. Many of the influences which affected agriculture in the 1960's will continue during the 1970's. Further technological improvements are expected; they will permit larger farms and ranches. Output per worker will continue to grow. Increases in total production may bring further reductions in prices and further pressures on profits. The most drastic effect of all, in terms of our Montana farmers and ranchers, might occur if agricultural policies at the national level were changed to provide freer markets for farm products.

The Montana Economic Study estimates that by 1980, total employment in agriculture may have declined by another 7,700 workers, and may account for less than 10 percent of the employed labor force by that time. You will recall that in 1968 it was 13 percent.

There has been much interest in feed lots as a potential source of new employment and income in Montana. We believe that more cattle feeding is a possibility for this state. Increased feeding would provide additional markets for cattlemen and for grain producers and would create additional job opportunities. It does not represent, however, an important source of possible new employment. In a good-sized highly automated feedlot, the only kind that can successfully compete today, six or eight workers can care for



10,000 to 15,000 head of cattle. Thus, ten new feed lots would mean less than 100 new jobs. If the fat cattle could be processed here in Montana (as well as fattened) that, of course, would require more new workers. It is possible that several hundred jobs might be created in meat packing plants. These are classified as manufacturing jobs and, therefore, would fall under the food products industry.

What are the prospects for jobs in the mineral industries in 1980? It is expected that employment in metal mining will increase during the 1970's. Those working on the Montana Economic Study assumed that there will be new copper production facilities in the state and that employment in metal mining may increase. New copper production facilities would mean new smelting facilities; at the same time, it is possible that some of the older smelters in the state may cease operation. They see little change here or in the oil production and nonmetallic mining.

They expect an additional two to three hundred coal mining employees by 1980. Many have high hopes for the coal development in eastern Montana in terms of its employment possibilities. Most of the reports seem to be enthusiastic speculation, not fact. Besides it takes roughly one worker in a strip mine nowadays to produce 25,000 tons of coal per year. This means that for every one million ton increase in coal production, only 40 additional workers will be required. Thus, although we are talking about millions (and I heard just yesterday about trillions) of tons of coal, we are probably only talking about jobs numbering in the hundreds.

Steam generating plants in eastern Montana also may create new employment. If steam plants producing power for export were to be constructed

in that area, and if steam generating capacity were to increase from 300 megawatts to 3,000 megawatts--that is, ten times--this would mean another 300 to 600 jobs. These jobs would be classified in the electric utilities, not in mining. In total they estimated an increase of 1,300 jobs in mineral industries between 1968 and 1980. But, the numbered employees in 1980 will still be considerably less than in 1960.

They foresee some new jobs in wood products industry, in food products (mostly meat packing and feed lots) and some other manufacturing. As some of you may know, Maxine Johnson recently completed a study on the wood products industry in Montana. She took a look at the potential effects of various types of public policy on timber production and on the supplies of timber reserves in this state, and the impact on employment, personal income and so forth during the years 1973 to 1975. (The entire study is reprinted in one issue of the Montana Business Quarterly). In that study, Maxine points out that the Montana Economic Study probably overstated the potential growth of the wood products industry. She goes on to say, "This implies serious consequences for Montana and especially to the eight western counties. Both areas are left to pin most of their immediate hopes for growth in primary employment on the mining industry, other manufacturing...and on the federal government."

They foresee further declines in railroad employment and an increase in the number of federal jobs. Combining these projections for an over-all picture, they see a further decline in total employment in the basic industries between 1968 and 1980. The decline will be much smaller than that which occurred during the 1950's and 1960's. They think that the loss will

amount to about 1,800 workers.

Employment in the derivative or secondary industry is expected to continue increasing during the 1970's, providing about 26,000 new jobs. Almost all of these new jobs will be in the service industries and in state and local government. They see Montana's job gap continuing--falling short by some 38,000 jobs over the next twelve year period. This means, of course, that Montanans will continue to look for jobs outside the state. Based on their estimates of employment, Montana's per capita income will continue to fall further behind the national average. Their guess is that by 1980 it might be as much as 21 percent below the national average.

There's a great interest in Montana in tourism as a source of jobs. It's an export industry in the sense that it brings money from out of state. Unfortunately, tourist industry doesn't fit into standard industrial classification. Mostly, of course, it is made up of firms from retail and service industries--restaurants, service stations, hotels, and motels. But, we don't know how many workers in those kinds of jobs devote their activities exclusively to tourism activity. So, we have no employment statistics or projections from the tourist industry.

Those that did work for the Montana Economic Study expect the tourist industry to grow, and that Montana will share in the increased travel of the 1970's. They do, however, doubt that its growth will be as rapid as some enthusiasts predict. Between 1950 and 1968, tourist-oriented industries in Montana increased their employment at about the same rate as did other trade and service industries. Their employment projection for 1980 assumed that employment in tourist industries will continue to grow at the same

rate as employment in other trade and service activities, such as was true during the last eighteen-year period.

One caution about tourism: to suggest that jobs in such businesses as eating and drinking places with average annual earnings per worker in 1970 of \$2,653, hotels and motels (average earnings of \$2,744) or service stations (\$3,769) are satisfactory substitutes for jobs in an industry such as wood products where the typical worker earned \$7,635 in 1970, is to reveal an unlimited understanding of Montana's economic problems. We need jobs that pay well and that will increase our widening per capita income.

Let me say again, that Montana is a large state and that the outlook for different regions within the state are quite different. You may wish to look at the portion of the Montana Economic Study which dealt exclusively with regional analysis. In general, those who completed the study were most optimistic about western and central Montana and the larger towns as opposed to the smaller ones--although in every case there are exceptions. On behalf of the Bureau, I invite you to consult the report for the projection for your part of the state, as well as the entire study.

## LAND USE PLANNING: ORGANIZATION SYSTEMS AND LEGISLATION

by Harold M. Price  
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During the past two years, I have attended many meetings, seminars, symposiums and various other types of get-togethers concerning a couple of major bills in Congress generally referred to as "National Land Use Policy." To understand the promise, the delightful reprieve, suggested by the words, "National Land Use Policy," you must have experienced the agony of land use planning when the buck stopped with the county commission or the city council.

National Land Use Policy implies that the nation has, or will develop, a policy concerning the use of land, and it necessarily follows that that policy will be expressed through a mechanism for carrying out land use planning and plan implementation. (And hidden away in that word "implementation" is another called "regulation.") On examination of the major land use bill, Senator Jackson's S632, it is apparent that the policy expressed is that there be land use planning rather than specific policy in regard to the use of land. And this is fine since most of us aren't quite ready to give up, by default, our responsibility at the state and local level to plan and manage our most important resource.

Senator Jackson's land use bill was passed overwhelmingly by the Senate just a few days ago prior to adjournment. Most people who have been close

to the legislation since its inception feel confident that the House and Senate will act favorably on the reintroduced bill and by next spring or summer we will have, for the first time in history, a significant expression of national concern for land use planning.

Basically, the bill sets up, within the Department of Interior, a mechanism for providing technical and financial assistance to state government for carrying out the land use planning process. It sets out for the states, a schedule for developing the necessary programs, administrative structure and staffing. It establishes broad criteria for establishing planning priorities, and the bill emphasizes the establishment of state resource data systems sufficient to meet the needs of continuing state wide land use planning. The bill does not provide states with any substantial input into the planning of federal lands. As I interpret it, it will only require that conflicts between state and federal land plans be officially recognized and resolved if possible.

The big split with tradition is this: state government is called upon to equip itself with the laws necessary to regulate the use of private land from the level of state government.

There is, of course, much more to the proposed National Land Use Policy, and when it finally becomes law the resulting administrative regulations of Department of Interior will add even more. The significant points are that state government is now asked to take the lead in land use planning and the federal government is willing to help. In order to appreciate this shift in responsibility, the new direction must be compared with the old. For the last 40 or 50 years, state legislatures, with a few exceptions, have been

blissfully passing on to local governments the authority necessary to carry on a rather credible job of land use planning and regulation. Having worked for state government, I may have been guilty of over-emphasizing a "mostly correct" idea that city and county governments should be the planners because they are closest to the people, know the most about their jurisdictions, have the most to lose (or win) and so on. Having worked for local government, I suspect that the delegation of such powers by states results, at least in part, from the principle of gravitation of crummy jobs in our intergovernmental system.

For many reasons, local governments haven't completely embraced the idea of land use planning. I know a lot of the reasons and I can understand them. They range from cost to lack of citizen support to a catch-all category which I call "deep felt philosophical convictions."

We need only to look at the results of our present scheme for land use planning to see the need for improvement. I am optimistic that the basic concepts expressed in National Land Use Policy legislation will set the stage for effective planning and implementation. And I would suggest that the stage, properly set, would look something like this:

The federal government must be involved to provide financial support and technical assistance; in particular, technical assistance through assembling and making available the vast amount of federally held physical, social and economic data necessary to the planning process.

Federal and state government must plan jointly for federal lands, and this is particularly important in the Rocky Mountain West where we are so

completely keyed in to the resources of federal lands. The federal government must recognize state plans in siting key facilities and in other major development decisions. And that state plan, which I would have the federal government recognize, must incorporate some national policy on such things as energy and population distribution.

State government must take the lead in land use planning. We can no longer simply delegate this tremendous task to local government. The state must identify those planning problems which transcend local jurisdictions' concern or ability to deal with and assume responsibility. The state must establish planning standards for its units of local government and stand ready to assist localities in meeting those standards. The state should also direct responsibility in those situations where local responsibilities are not met.

Local government must equip itself to deal with those land use planning problems which are primarily of a local nature and which can be dealt with effectively at the local level. The majority of day-to-day land use decisions would continue to be made at the local level, but within the framework of locally developed plans which are consistent with regional and state objectives.

The land use planning "system" described is essentially a planning partnership between federal, state and local government. The basic concepts are reflected in presently proposed National Land Use Policy. Much of the necessary legal research and drafting of legislation has been accomplished over the past few years by the American Law Institute. And a few states (primarily Maine, Vermont and Hawaii) have implemented variations of this land use planning system.



All of the foregoing has been a discussion of planning organization and systems. The substance of planning is still dependent on well defined public goals, good information and citizen participation. There must be --and I believe this is developing--a new public attitude toward private property. It seems clear that present day public concern for environmental quality suggests a willingness to assert broader authority over the use of private lands (although this may be true only in case of someone else's land).

Planning techniques must (and are) changing. We cannot insist on truly "comprehensive plans", although we must strive toward that goal. Land use planners in the past have gone through incredible gyrations in attempting to be "comprehensive" and recognize the relationships between land use, economics and social considerations. The addition of environmental and ecological considerations has made "comprehensive planning" truly incomprehensible.

When faced with the demand to be comprehensive, land use planners have been known to undergo complete withdrawal, frequently accompanied by a condition known as rigor interrelationis, which is a comatose state induced by the trauma of the realization that everything relates to everything else.

In brief, there are many land use planning problems which can be identified out of context of all of the social and economic considerations. For example, we are aware of the fact that flood plains must not be developed. We are aware of certain problems in regard to the design of subdivisions and their streets and roads. We are also aware of problems involved in the development of steep slopes and of other areas subject to soil and geological instability. There are many other examples of land use planning which should

and must occur and can do so without striving for total "comprehensiveness".

An additional word of explanation is due in regard to the implementation of a national land use policy. As I have indicated earlier, the states have historically relegated the responsibility for land use planning and regulation to local government. This has been done through permissive legislation which has resulted in failure in many, if not most, cases of local government to undertake the task. A nearly identical problem exists, or will exist, with the relationship between state and federal government when a land use act is passed. The original proposal for a national land use planning policy bill contains some sanctions which would make it extremely attractive, if not effectively require states to undertake land use planning. These sanctions were in the form of accumulative reduction of some major funding programs made available to states, such as highway funds. It was proposed that states failing to act in meeting the goal of national land use policy law would lose up to 21% of those funds available for highways and other purposes; however, those sanctions, which were removed from the Senate-passed bill, may crop up again during the next session of Congress. As it stands now, if the present Senate version does eventually become law, there will be very little incentive for states to follow through with their land use planning program--that is, of course--only in the case of those states who do not want to. The only real sanction contained in the bill is that states that do not plan will not get planning funds.

There is another incentive which is somewhat nebulous, and it lies within the area of states being in a better position to influence the land use

decisions of the Department of Interior in those cases where that department is planning and managing its lands within the state.

I do believe, however, that most states (and certainly ours) will respond to the challenge and the opportunity to deal with land use problems through a new approach to planning.

## RESOURCES OF THE FUTURE

by James A. Posewitz  
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Perhaps the first point that needs clarification is that ecology is not an element. Ecology, in addition to being both the most misused and misunderstood word in use today, is a relationship. As a relationship, it is no different today than it was a hundred or thousand years ago. It is things; animal, vegetable and mineral, interacting with one another. On evolution's terms, this interacting became a symbiotic relationship, for the survivors at least, until one incredibly clever species became totally dominant and arbitrarily decided to live outside of the constraints that had contained all living communities up until his emergence.

The decision to live outside the system was not a conscious thing, voted on at a town meeting or global referendum, but rather a natural process of an animal following the course of least resistance. It is certainly to man's credit that he eventually recognized his predicament, and now, belatedly for some and prematurely for others, has decided in a most democratic way, and unnatural way, since it is no longer the course of least resistance, to do something about it.

This symposium is certainly ample evidence that as a concept, ecology is receiving verbal recognition to the point of being tiresome. On the other

hand, as a practice engaged in by men, it is still in the starting position. This situation certainly begs the question, "How does a society that has just learned a language that includes the word and still argues its precise definition, ever begin to practice some?" Perhaps an even more basic question, "Does society in general, and do Montanans in particular, really want to go ahead and seriously try this?"

To answer the latter question first let's briefly review the recent history of environmental legislation that appears to solidly support the contention that Montanans, speaking through their elected representatives, are serious about laying on a little ecology.

It is probably fair to say that the concept of preserving a natural world began creeping into Montana law about 1963 with narrow passage of the "Stream Preservation Act"--the first of its kind in the nation. The stated policy of the act was, "It is hereby declared to be the policy of the State of Montana that its fish and wildlife resources and particularly the fishing waters within the state are to be protected and preserved to the end that they may be available for all time, without change, in their natural existing state except as may be necessary and appropriate after due consideration of all factors involved."

Since everyone knew then as they know now, that we were not to be trusted, the law at that time was written to expire in two years. In 1965 the law was improved and renewed indefinitely by an overwhelming majority--in fact with only a single dissenting vote in both houses of the state legislature.

The passage of this law demonstrated a variety of things. It demonstrated both the relevance and importance of the fish and game resource in Montana. It demonstrated that individual resource abuses had to become public scandals before much would be done, and finally it demonstrated the possibility that preservation of certain values could accompany development if the developers were willing, and in agency activities authorized, to make sacrifices. In some cases, costly sacrifices.

Between 1963 and 1969, environmental legislation consisted of some pretty bland material, notably "voluntary strip mined land reclamation" and a dredge mined land reclamation act that later failed to survive the test of constitutionality. As was the case with the Stream Preservation Act, the bills were in response to incredibly gross injustices being laid upon the land. All the laws on the books, however, failed to curb the abuses maximizing profits heaped upon the land. Environmental deterioration as a result of natural resource exploitation continued virtually unabated through the late 1960's and into the first years of the 1970's. The 1971 legislature reacted with a vengeance, passing a host of environmental bills and hopefully clarifying for the present the intent of Montanans--"It is the policy of this state to provide for the reclamation and conservation of land subjected to open cut or strip mining and thereby to preserve natural resources, to aid in the protection of wildlife and aquatic resources, to safeguard and reclaim through effective means and methods all agricultural, recreational, home and industrial sites subjected to or which may be affected by open cut or strip mining to protect and perpetuate the taxable value of property, and to protect and promote the health, safety and general welfare of the people of this state." The Montana Open Cut or Strip Mined Land Reclamation Act.

"The extraction of mineral by mining is a basic and essential activity making an important contribution to the economy of the state and the nation. At the same time, proper reclamation of mined land and former exploration areas not brought to mining stage is necessary to prevent undesirable land and surface water conditions detrimental to the general welfare, health, safety, ecology, and property rights of the citizens of the state." The Hard Rock Mined Land Reclamation Act.

"It is the public policy of this state to: Conserve water by protecting, maintaining, and improving the quality and potability of water for public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation, and other beneficial uses;" contained in the total revamping of Montana's Water Quality Act.

"Declaration of purpose. The control of pesticides and their use is essential for the protection of man and his environment." The Montana Pesticides Act.

And perhaps the most significant, "The purpose of this act is to declare a state policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the state; and to establish an environmental quality council." The Montana Environmental Policy Act, significantly the first environmental bill of a comprehensive nature, and not in direct response to a specific abuse.

The frosting to all this came when Montanas adopted a constitution which had as one of its provisions, "The state and each person shall maintain and

improve a clean and healthful environment in Montana for present generations. The legislature shall provide for the administration and enforcement of this duty. The legislature shall provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources."

In all the preceeding legislation the importance of Montana's fish and game resource was not overlooked. In fact, perhaps its relevance in Montana's struggle to reorder its priorities was clearly acknowledged in assigning the Fish and Game Department to the advisory board in the Surface Mined Land Reclamation Act, the appeals board in the Hard Rock Mined Land Reclamation Act, the registration board of the Pesticides Act, in addition to enforcement authority in the amended Stream Preservation Act and a number of antilitter laws.

So much for the question, "Does society in general and Montana in particular want to seriously try some environmental control?" It should be clear that they do.

The other question, "Are we ready to begin practicing some form of ecological respect?" is of course another matter. It is imperative that we acknowledge at this point that there is still considerable question as to whether or not we are capable of practicing what we have all become so good at expressing in theory regarding making "development" compatible with ecosystem respect. We are only beginning to learn if there is an area of compatibility between logging and elk management. We have yet to demonstrate our ability to make mining compatible with any other endeavor. Agriculture efficiencies still tend to machine attended monocultures.



Herbicides that ignore needs of animals coinhabiting rangelands are widely used to replace browse with grass. Coyote, bear and domestic livestock relationships have yet to reach the area of rational discussion, and the thought of legal recognition of a trout's need for water is still regarded with mild amusement in irrigation circles.

In Montana these are the relationships that must be made compatible with the needs of fish and wildlife, and let us stress here the point that the needs of, rather than the demands for fish and wildlife are what we are talking about and there is a tremendous difference, if we are to accomplish our goal of some sort of a balance in our future.

There are a few examples where we are making some attempt at development in the spirit of compromise. Big Sky Development in the Gallatin is one example of such an effort. To accommodate that project, the West Fork drainage was more or less dedicated to intensive economic development and human habitation. When the opportunity came to balance that development with increased wilderness opportunity in an adjacent drainage, it suddenly became a different story, and the Jack Creek Road was more important to developers than previous speeches on balance and compatibility.

Another attempt at the ecological or environmental balancing act is underway at Lincoln with the outcome still in question. In cooperation with the developer we are now fortunate in having a much more sophisticated understanding of the resources we are dealing with, but our ability to accomplish the compatibility objective is yet to appear on the scoreboard. The same is true for a similar effort being made with a coal miner in the Bull Mountains near Roundup. Most other economic developments forge ahead with

only promises of respecting Montana's native plants and animals, the less information apparently the better. In most cases we eventually find ourselves up against the simple questions of "How do we go about convincing developers to accept less than optimum profits and surrender to the common interest of all Montanans what they hold as private rights and privileges in order to preserve a natural system that may net them nothing?" Our ability to accomplish that determines whether or not we will be able to carry out in practice the beautifully worded statements of policy now prefacing the laws we currently work with.

If we are to accomplish, on a significant scale, the compatibility we all find so easy to talk about, we must begin discussing some of the things we do not find easy to talk about, and that is a degree of renovation of two cornerstones of society: profit motivation and property rights. We must begin talking in support of agricultural inefficiencies, we must consider tempering rather than optimizing profits, and we must begin the distasteful process of putting constraints on rural property rights comparable to those already enforced on urban property owners.

Actually, it is a process that has already begun, and a process that is quite likely necessary to maintain the variety and magnitude of Montana's present fish and wildlife resource. Today as a state we appear to be floundering in the limbo between the motivation that developed America and the temperance needed to preserve it.

Now before we get all choked up over the erosion of our cornerstones, let's for perspective's sake look at the ownership of Montana. When Lewis and Clark visited this portion of our ecosystem less than 170 years ago, their

trespass problems were minimal and the ones they had were not related to a concept of anyone's privately owning the land as such. Admittedly there were some minor instances of territorial display on the part of the permanent residents at the time. The hostility was unnecessary, since we as a nation had no intention of taking their land. This fact was demonstrated by establishment of a permanent frontier by Congress on May 28, 1830. In fact, our intentions were so honorable that Congress did it again on June 30, 1834. Needless to say, these permanent frontiers were repeatedly violated. "To justify these breaches of the "permanent Indian frontier" the policy makers in Washington invented Manifest Destiny, a term which lifted land hunger to a lofty plane. The Europeans and their descendants were ordained by destiny to rule all of America. They were the dominant race and therefore responsible for the Indians--along with their lands, their forests, and their mineral wealth. Only the New Englanders, who had destroyed or driven out all their Indians, spoke against Manifest Destiny."

One of the generals involved in carrying out the process of Manifest Destiny was known to the Indians as Star Chief Carleton, who had this to say about the entire affair, "The exodus of this whole people from the land of their fathers is not only an interesting but a touching sight. They have fought us gallantly for years on years; they have defended their mountains and their stupendous canyons with a heroism which any people might be proud to emulate; but when, at length, they found it was their destiny, too, as it had been that of their brethren, tribe after tribe, away back toward the rising of the sun, to give way to the insatiable progress of our race, they threw down their arms, and, as brave men entitled to our admiration and

respect, have come to us with confidence in our magnanimity, and feeling that we are too powerful and too just a people to repay that confidence with meanness or neglect--feeling that having sacrificed to us their beautiful country, their homes, the associations of their lives, the scenes rendered classic in their traditions, we will not dole out to them a miser's pittance in return for what they know to be and what we know to be a princely realm."

Another significant quote found in the book "Bury My Heart At Wounded Knee" attributed to the Chief Red Cloud reads, "They made us many promises, more than I can remember, but they never kept but one; they promised to take our land, and they took it."

It is usually at this point we choose to begin remembering history and discussing such things as rights, and start thumping our chests about carving Montana out of the wilderness. Carving we did, wilderness might better have been described as the grass-buffalo-Indian ecosystem which in spite of its discomforts did function without degradation.

The point here is not a plea to return to primitive Montana, that is not one of our options. The point is, we need feel no sense of guilt in being so presumptuous as to demand that land, public and private, be treated in such a way as to contribute to the common benefit of all society.

Today, given the legislative and constitutional commitment to environmental quality and ecosystem respect, we appear ready to begin the serious practice of preserving a unique Montana way of life. Suggested were some of the basic obstacles and principles in need of substantial modification or change. The finale must then be identifying the initial steps necessary to effect the basic and essential change. What mechanism do we use to convince boards of

directors to spend significantly and temper profits in the public interest? The public interest as identified by whom? How do you tell the coal industry to put stockholders second or third? How do you tell utilities to convert advertising funds to public information on how to conserve electricity? How do you tell firms with coal leasing rights that thermal electric generating is too inefficient and we should be tempering demand? How do you tell a logger that defacto wilderness and grizzly bears are more important than his export market?

When we can answer these questions we will begin to move ecosystem concern into the field of reality. If we are assembled to consider as the program implies, "Resources of the Future" we much begin by acknowledging that in many respects resources being utilized today are in themselves resource options being foregone for tomorrow. How we utilize those that inevitably must be used affects not only tomorrow's options, but also associated renewable resource capacity.

Montana has the capacity to contribute substantially to the national and perhaps global resource demand. Montana has the opportunity to do so and still preserve the major portions of her natural systems. If this is to be accomplished it must be done not under rules and constraints placed by economic systems, political systems or cultural systems, but under the rules and constraints placed by the natural system.

## NATURAL RESOURCE OPPORTUNITIES SUMMARY

by Roy E. Huffman  
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I have jotted down eight major topics that seem to provide a focus for summarizing this Symposium. It seems to me that one of the first and most obvious things that came out here had to do with the matter of growth. In fact, there are now questions being raised by a great many people about the desirability of growth. In this country, we've had a long standing tradition and acceptance of the idea that growth is good.

Gary Wicks was the first one to raise questions about whether or not growth is good. At least we recognize that it is a major question when people talk about the use of resources. How do we relate this to our value system? Is there some sort of a middle road? Lieutenant Governor Tom Judge also talked about the matter of growth. He said there is a new concept of growth needed based on needs and desires of people in Montana rather than the nation's growth needs. Of course, this is going to be a tough one to realize. Many of the resources that we have in Montana are the sort of things that are important in terms of the national goals and needs. He said also that we're beginning to recognize that growth is not necessarily the answer to all of our problems. It is something, however, that has been

pretty much ingrained in the American way of doing things and in the American value system. This, of course, relates very much to all the things that kept popping up in a conference of this kind related to coal development in eastern Montana. One of the questions very often raised, at least in terms of whether growth is good or not, is that coal development may well be a limited time thing and then what happens after the coal is gone. I suspect the time element is something that we can't forecast very well, because it depends on how fast and on what kind of a basis we go after the coal and what kind of developments go with it.

The second issue that seemed to be running all through this Symposium is who makes the decisions. This is obviously one that is of concern to all of us. Several people talked about this and about who has the authority to do what. How can we judge the capability and make the decisions, until we know better exactly what kind of resources we're talking about? What is the role and the view of the federal government in some of these things? A major question we have to face is the role of the federal government. The nation needs these resources. In relation to this sort of thing, Tom Judge talked about the need for some new legislation that would make it possible for the people of the state to have a bigger voice in the decision making process. Ted Schwinden, in his discussion, talked about the determination that the people of Montana have about the decisions. To really have a voice in this, they must identify their priorities. They must emphasize people oriented values and reflect the local values. Later on, I thought Ted really wasn't sure this was going to happen. Later, he said something about the decisions regarding the use of Montana resources which were going

to be made by individual agencies and forces from outside Montana.

Dick Schaffer was the substitute speaker here for Dr. Duane Lloyd. He talked about the matter of who makes the decisions, in terms of the people who are far away having as much to say about wilderness as local people. Probably they have had more to say in really getting areas set aside as wilderness than have the people who live right there. I'm always reminded of the time that I was in a social setting in Washington, D. C., and an elderly lady was talking to me about her support of wilderness. This was the time when the emotions and the conflicts were pretty intense before the passage of the Wilderness Act in 1964. After talking with her for a time, it turned out that her concept of wilderness was Rock Creek Park in Washington, D. C. One of the things that Dr. Schaffer talked about was the difficulty of defining just what wilderness is. It does mean a lot of different things to different people. The last person who made some considerable point about the matter of who makes the decisions was Hal Price. He talked about national land use policy and the role of local government and state government and federal government in decision making. He suggested that we are probably going to see, whether we like it or not, a change from local land use planning and decision making to state responsibility. I made a note here that, if I'm not mistaken, Hawaii wrote their constitution (which was not too long ago and is one of the newer state constitutions) to put planning and zoning in the hands of the state government.

Another topic that seemed to be of interest is what can we learn from the past. What does the past tell us about the kinds of things that we are concerned with here? There are a number of people who talked about the



role of history. Carl Bronn talked about the background of some of the water legislation, and some of the water policies we have. Certain kinds of power were given to legislative bodies and government agencies in terms of managing and determining how we're going to use our water resources. The matter of the historical perspective was also discussed by Vincent Brown. He had one especially interesting statement -- the future will be like the past but it will be different. He did say with some emphasis that we have to understand the past to really understand the future very well. This is one statement that I think I would agree with whole-heartedly. We need to point out the importance of a resource not simply because it happens to be there, but because it will satisfy human wants and needs and have an economic value.

Pete Jackson talked about some of the things that the past can tell us. One statement that Pete made, I agree with to some extent, but I think historically it tells us some other things too. Pete stated the view that the Homestead Act was probably the biggest mistake made by man. One could draw this conclusion because it did not fit the western situation, the semi-arid west that we are familiar with. The Homestead Act did a good job in that its intent was to get this vast continent of public land into private ownership. The problem was that they didn't adjust it fast enough to fit the conditions as settlement moved west, but they kept trying. They went from 160 to 320 to 640 acres. It still wasn't big enough to handle this kind of an area. One of my heroes in my western reading is a man named John Wesley Powell who is best known to most people as the person who explored the Grand Canyon of the Colorado River. He also ran an expedition over

most of the semi-arid plains country. He came out with a statement that it would require twenty-five hundred and sixty acres for an adequate range unit on the Great Plains. At that time that would have been a pretty good unit -- that's four sections. Apparently he made this estimate based on the amount of land required to pasture the horses they used with this particular expedition. I think we can learn historically about some of these things; why they did happen and maybe it will help us answer some of the other questions.

Walter Martin, I thought, gave us a tremendous list of fifteen major cultural trends. This is as good a background in one list as we'll find as to why we have some of the values, why we have some of the institutions, and why we have some of the things we do that surround this whole matter or preservative resource use. It sets out the conflicts that we have between economic values and some of our non-monetary intangibles that we are becoming more concerned about all the time. He talked about how these have been underway for some time and that there's no real likelihood they are going to be reversed very fast. I think this is one of the problems that is of concern here. I'll mention a couple other places where this comes out. Some of the things that happened as a result of these kind of trends run all the way through a technology to values to population trends and so on. He said over one-half of the nation's counties have lost population in the last ten years. If my memory is correct, thirty-seven of Montana's fifty-six counties lost population in the ten year period between 1960 and 1970. I think an even more significant figure may be the fact that something like fifty-three or fifty-four percent of the population

of Montana is now in seven counties which tells you something about what's happened in the other forty-nine.

Jim Posewitz also talked about what we could learn from the past in terms of the kinds of things that have lead up to our present situation including environmental legislation. Jim reads some of the same material that I do as it turned out. He talked about one of the interesting things which I think we ought to all be familiar with, and that is buffalo and buffalo grass in the ecosystem. One of the things that interested me is that it worked so well. The Indian culture may have been a near-perfect balance of population and available resources. Probably the quality of life went up when the Indians had the first real introduction of something from the outside of the system when they got the horse. I have visited a number of those places where they ran the buffalo over the cliffs. That was the best way to harvest them before they had the horse. I suspect they had a lot more fun after they got the horse. So this sort of thing may have been the first time that there was anything approaching technology, other than a few simple tools, introduced in the great plains semi-arid country.

A lot of people talked about the use of resources which is the next major topic I have here. This is the thing we are all concerned with in this Symposium. It seems to me that there are a number of things that are related to this including using resources in a way that we can no longer defend. Obviously, there are some reasons for it. At one time it looked like they were all in such great plenty that we didn't have to worry and there would be no problems. When Pete said that the biggest mistake made

by man was the Homestead Act, it reminded me of the time I was sitting in a conference with some people in the Public Health Service in Washington and one of the engineers said that the biggest mistake ever made by man was when he built the first sewer in London because from then on we had the idea that there was only one way to get rid of waste and that was to float it away by using water. No one worked on other methods of waste disposal. Depending on where we live and what we observe, there are a lot of different things that we could classify as the great mistakes that were made by man.

The other thing that I think goes right along with the use of resources is the whole matter of values, both with the individual and the society. This is the thing that is now becoming a major factor in the kind of things that we're talking about. Don Brown talked about the importance of habitat for wildlife. This is no longer really a question because it is a concept which is pretty well accepted. The sophistication of our management of these resources is the question because the activities of man have a tremendous effect on the environment. We have to recognize that anything that man does has an effect one way or the other on environment. Dr. Schaffer talked about the changes in people's values; the need for some kind of outdoor experience; the primitive experience and one of the things he said helped my ego just a bit. There seems to be several options and one of them is that we need more recreation resources near centers of population for outdoor recreation. I think it was in 1963 that I was appointed to the Natural Resources Committee of the Chamber of Commerce of the United States. They have only one academic person on a committee of about

fifteen people; such people as the Vice-President of Weyerhaeuser Timber and Bunker Hill mining; the coal companies from West Virginia; and the President of the Wyoming Stock Growers. It is a very interesting group. My first meeting was in Spokane and they put me on the program and suggested that a Dean of Agriculture, which I was then, should have some ideas on wilderness legislation. The issue was then about as hot as anything you could ever be asked to pick up. I made a few brief comments about the wilderness legislation and then gave them a pitch on how really great it would be if, instead of being in opposition to something, they had a positive program. The positive program I suggested was what I called accessible outdoor recreation for people in the urban areas. After all these years, it was good to hear Dr. Schaffer talk about the need for this.

Dick McConnen talked some too about the matter of values. He talked about the decisions of when, where and how to use resources. Under our system we are concerned with the profit making system and the decision makers are not really the creators of anything. They operate within a framework of values and constraints and with a given set of resources. He said something like this; if there's going to be a new ethic it will involve changes in the rules and constraints and not in the process of decision making.

Bob Harris also talked about the matter of values. He was the first one who really began to talk about the part of this that involves the trade-offs between environmental values and the use of resources. More specifically, it finally comes down to the relationship of how we use resources to job and employment. One of the interesting things he discussed is an illustration of how complex this all is and that there are really no

simple answers. We can't sort out one piece of it, and come up with a simple answer in terms of wood products. Bob Harris said something about the production of substitutes for wood products requiring more energy than the production of wood products. This, I think, is an interesting point because it ties right in with the kind of decisions we are talking about. Some of the things we do, in some instances, may actually increase rather than reduce the pressure on some other resources. You will recall that in this conference, and particularly in one period yesterday there was a great deal of concern about energy requirements. There are some other things that affect this. In the whole value system we think that there have been some tremendous shifts in values in the last few years, and yet, as we were talking about it here we sort of concluded that there hasn't been that fundamental a shift in values; it is mostly a matter of appearance. For those that can grow hair there's more hair around and I wouldn't be surprised if there's more energy required now in the production of shirts. I think most of us forget that we have a bigger selection of shirts than we ever had now with new colored shirts. So again the question, and it comes back to this one of our values and how fast can we change them. I think most people are pretty well agreed that we are not going to change them all that fast. They change gradually unless there is some sort of a serious impact which probably would have to be as serious as a war or something like that if it's to change our value system very fast.

Walter Martin talked about this matter, too, of values of the individual and the society. There are a great many things that have happened in recent years. He went on to say that in the whole value system of the

country, the one thing that has the greatest importance is the environmental movement. It seeks to change the way we use and abuse our environment. He commented that the movement is decentralized and is very diverse. He said the extreme proponents are not always loveable but the fact remains that they have had a tremendous impact and they get things done. What the individual can do involves great personal satisfaction. But what individuals do in terms of their own personal life style really doesn't have that much effect on the problem.

Now let's continue to talk about values and changes in values. I think it's at this point that most of us begin to recognize what we are really talking about under the American economic system is the kind of trade-offs we are going to make. This becomes very difficult and also becomes a controversial area of conflict and in some cases it becomes highly emotional. What kind of trade-offs are we willing to make in terms of the uses of resources and the kinds of things we are willing to give up. Are we willing to substitute one thing for another and how much more are we willing to pay than we might otherwise pay. Bob Harris talked about this at considerable length in terms of the use of timber and the things that might be done in the long run. There really isn't too much that could be accomplished in the short run in terms of increased timber production but in the long run there might be.

Vincent Brown talked about the fact that we have no real control over the location of resources and that we have to go where they are if we want to use them. If we don't want to use them; if we want to put some other value on them, we have to make the trade-off of not using them or using

them under some tremendous constraint. Also on this matter of trade-offs, he talked about where is the capital going to come from for the development of the energy required, where do we find the energy if we try to maintain most of our present values and desires. He also pointed out pretty strongly that he didn't think our national life style can be turned around much in fifteen years. So apparently, this is the basis for much of the projection that has been made about energy needs. Somebody asked why not go to Madison Avenue and turn the whole thing around but this is going to be pretty difficult to do and probably isn't going to happen over a short period.

Vincent Brown asked where is all the capital going to come from. If we are able to turn some of the value system around we are talking about and change some of the comfort factors with which we live, in terms of choices, we would have to decide what kinds of things can be cut out. There are some things we can probably do without. Where we consider the things that you have to do in relation to the nation's energy needs and the kinds of trade-offs we become involved with things that are quite popular and the idea that we should give up some of those silly gadgets we have that take some electricity. But these aren't going to have much of an effect. One of our engineers did some rough figuring a couple of weeks ago to the effect if everybody in the United States who had an electric toothbrush tossed it out and quit using it. He started with some conservative estimates so people couldn't accuse him of running a loaded analysis. He assumed that 80 percent of the people used them everyday and that they brushed their teeth three times a day which is probably not true. He finally ended up with an estimate that all the electric toothbrushes in the United States



would use about one-tenth of one percent of the power that's going to come out of the presently proposed Colstrip generating plant. So we are going to have to find more important things. There are some things that we may not be quite so willing to give up like air conditioning, central heating, or clothes dryers. So when Vincent Brown asked who was going to put up the money to build the energy facilities we are going to need, I wondered where we were going to get the money to remodel man's physical plant (homes, offices, factories) in order to turn this thing around and not use the amounts of energy the way we are using it. Are we going to do without central heating as is the case in some places in Europe and wear heavy clothing indoors? These are the kinds of things we should be talking about. We are not going to solve the problem by talking about electric toothbrushes, electric carving knives and self-stirring sauce pans. We should talk about major kinds of choices we have to make and the trade-offs that are involved.

There are two more short topics to discuss. It seems to me that another topic that runs through our discussion that people are concerned about is the whole matter of the kind of constraints we are going to be operating under in our decision making process and our use of resources. There were a number of discussions of this particular issue. John Toole talked about the matter of what kind of legislation we are going to have. His discussion this morning of the new constitution was an indication of the kind of a new framework we have. We might have had some even stronger constraints on some things but some of the environmental proposals in the new constitution including the public trust proposal and the citizens suit type of thing didn't pass.

Keith Colbo talked about the way in which the tax system as well as the collection of revenue can be used as a constraint in terms of either an incentive or a restriction on what we might do. This becomes particularly important because Montana is a resource based economy.

I have a couple of comments related to what Pat Douglas talked about regarding economics and employment based on the Montana Study. Her report brought out the kinds of trade-offs that are involved in many of these things and that what we do with the resources or what kinds of environmental values we are willing to pay for in one way or another have an effect on the available products or the use of resources for other purposes. We become more concerned when in some cases, they are put in terms of employment. She pointed out that many of the best paying jobs in Montana are in the employment areas that relate to the use of natural resources.

I think these are the kinds of problems that we are going to have to explore ways to communicate better to find some of the answers or some of the compromises. I think more and more people are recognizing the trade-offs, in terms of environmental values versus economic values if you want to put it that way. But some place along the line it's not going to be at one end or the other. If these kinds of sessions can help to get dialogue going and increase the understanding on both sides, then they serve an important purpose. As a university person, I think university people should have a strong interest in this, because many of the problems we see around us have grown out of the technology we have helped to develop and our use of the technology. Some scientists and engineers don't want to admit that they had a part in creating the problem. But the answers are in part to be

found in new or modified technology. I'm not a confirmed believer that technology is the answer to everything. It hasn't been in the past. But at least it is part of problem solving, in some instances, even though we don't have all the answers yet for some of the things that need to be done.





